



AGRICULTURAL RESEARCH INSTITUTE

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CONTENTS

	PAGE
To the Man on the Land.....	5
How Can We Best Serve, by W. J. Black.....	6

PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
Experimental Station for Northern Ontario, Kapuskasing, Ont.	7
Experimental Station for Northern Quebec, Spirit Lake, Que	8
The Division of Horticulture:—	
Experiments with Chrysanthemums, by W. T. Macoun	9
The Tobacco Division:—	
Canadian Tobaccos and Their Possibilities, by F. Charlan	10
The Entomological Branch:—	
The Cost of Spraying in the Control of Pear Thrips in British Columbia, by A. E. Cameron, R. C. Treherne and E. W. White	13
The Fruit Branch:—	
Inspection at Point of Shipping, by K. B. Robinson	17
Fruit Meetings	18
The Health of Animals Branch:—	
The Suppression of Glanders, by C. D. McGilvray	19
Infraction of Quarantine	22
The Live Stock Branch:—	
Co-Operative Wool Sales, by T. Reg. Arkell	23
Conservation of Live Stock in Western Canada—The Carlot Policy, by P. E. Light	25
The Seed Branch:—	
Field Root and Vegetable Seed Growing in British Columbia, by Jas. R. Fryer	26
Dominion Department of Agriculture Honour Roll	
	27
The Publications Branch:—	
Publications Distributed in 1916.. . . .	28

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

The Feeding of Dairy Cattle:—	
Macdonald College, by H. Barton.....	30
The Oka Agricultural Institute, by Bro. M. Isidore.	31
The Ontario Agricultural College, by A. Leitch.	33
Alberta, by J. McCaig.	34
The Control of Gophers:—	
Manitoba, by V. W. Jackson and J. H. Kiteley.....	35
Saskatchewan, by F. H. Auld.. . . .	37
Alberta, by J. McCaig.	39
British Columbia, by Wm. J. Bonavia.....	40

Ontario:—	PAGE
Administration of the Department of Agriculture.....	43
Manitoba:—	
Seed Exchange.....	44
Saskatchewan:—	
The New Deputy Minister of Agriculture	45
Enforcement of the Noxious Weeds Act	45
British Columbia:—	
Professor J. A. McLean.....	46
Nursery Stock Importations, by R. C. Treherne and W. H. Lyne	46

PART III

RURAL SCIENCE

School Fairs:—	
Prince Edward Island, by W. R. Reek	48
Nova Scotia, by L. A. DeWolfe	48
New Brunswick, by R. P. Steeves	50
Quebec, by Jean Chas. Magnan	52
Macdonald College, by J. E. McOuat	54
Observations made while visits to Potato Plots in School Fair Competitions Were Paid, by J. Harold McOuat	56
Ontario, by C. F. Bailey	57
Manitoba, by S. T. Newton	59
Northern Saskatchewan, by Fred W. Bates	64
Southern Saskatchewan, by A. W. Cocks	66
Alberta, by J. McCaig	69
British Columbia, by J. W. Gibson	71
Manitoba:—	
School Inspectors' Conference	74
British Columbia:—	
Victoria Home Products Exhibition, by J. W. Gibson	74

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Acts Relating to Agriculture	78
Potato Growing and Gardening Contests	84
Associations and Societies	85
New Publications	92
Notes.....	94
Index to Periodical Literature	96

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TO THE MAN ON THE LAND

FOR two years and a half, War, red and ruinous, has raged through the world, and still no decision has been reached. There is reason to hope that before 1917 closes the struggle for liberty will have been won, or be greatly advanced. Amid the varying phases of this titanic conflict the fact stands out more clearly than ever that agriculture is of supreme importance. Extraordinary measures are being taken by the allied countries to increase and encourage production. It is earnestly hoped that every farmer in Canada will strive to increase the food supply of the Empire. A still powerful and unscrupulous enemy openly avows its intention to try and sink all ships carrying supplies to England during the coming year. In the tremendous strain yet to come a vital factor will be an ample and un-failing flow of food to England and France. No matter what difficulties may face us the supreme duty of every man on the land is to use every thought and every energy in the direction of producing more, and still more.—

MARTIN BURRELL,

Minister of Agriculture.

HOW CAN WE BEST SERVE?

BY W. J. BLACK, B.S.A., AGRICULTURAL INSTRUCTION ACT COMMISSIONER

IN considering, as we well may, the part we are playing in the great task of the hour, two things must be borne in mind as being of outstanding importance. First, maintaining and increasing Canada's forces at the Front, and, second, maintaining and increasing production, both of food and munitions. Into one or other of these channels should all our energies be directed if we are to do our share at this the beginning of a New Year.

If every shell is a "life-saver" as well as a "life-taker", it is equally true that every bushel of grain, every pound of beef, mutton and pork, every consignment of cheese and flour, which we can produce and spare over and above our own pressing requirements, will help to lighten the burden and even save the lives of those doing their part nearer the firing line.

Many will assert that farmers, educators and leaders in agriculture can render more efficient and equally important service in the line of their calling than they could do elsewhere. With the possibility of a real scarcity of food facing the Mother Country, the question of maintaining production is increasingly vital. It is in giving that greatness is found;

and in reaching a decision in this connection each should ask himself, Where can I best serve? Where can I most give?

The call to arms has met with a noble response from trained workers in all branches of agriculture. The ranks of agricultural leaders and instructors have been seriously depleted. Graduates and undergraduates in agriculture have manfully gone forth. Canada can ill-afford to lose men of these classes. Some, we know, can never return; their loss we shall mourn; their memory we shall honour. Upon those who remain there rests an ever-increasing responsibility. At no time in Canada's history has the success of Agriculture been more vital to the country's welfare. Upon farm production depends in no small degree the ability of this country and of the lands across the sea to maintain the effort until the goal is reached. Even afterwards the continuance of prosperity will be greatly dependent upon it. The call to National Service is heard throughout the land. All must help. Perhaps never again in the lives of men now living will such an opportunity for service present itself as in 1917.

Our faiths and attitudes to the world about us are largely forged in childhood. Whether children shall see in the rolling suns, the nodding flower, the blithe warble of the bird, merely an exhibition of chance mechanical complexities, or whether they shall see the expressed personality of a kindly Creator will depend largely on the teachers' and parents' attitude of indifference or of reverence to the things of Nature, not as expressed in words, but as expressed in personal adjustment to the universe and in the manner of life that follows.—*The Nature Study Review*.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

EXPERIMENTAL STATION FOR NORTHERN ONTARIO
KAPUSKASING, ONT.

IN December, 1914, the Director of Experimental Farms visited points along the Transcontinental railway for some 75 miles west of Cochrane, with a view to choosing a suitable site for an Internment camp for alien enemies.

The selection of the site was very largely influenced by the necessity of choosing land covered with standing timber, to permit of the interned men being put to work at once.

An excellent location was found where the railway crosses the Kapuskasing river. Camps were erected here and operations begun. The land is probably as good as any to be found along the line of the Transcontinental.

The area chosen was the property of the Provincial Government of Ontario, which granted the use of it, in the first instance to the Federal Branch of Internment Operations, with the understanding that the prisoners' labour would be used, as far as possible, in clearing and preparing land for an Experimental Station. For the latter purpose, the land is ultimately to be deeded in fee simple to the Federal Government by the provincial authorities.

The Experimental Station site comprises some 1,000 acres in the township of O'Brien, contiguous to

and embracing part of the Detention Camp area.

As practically all the unskilled labour has been performed by the prisoners, most of it has been under the direct supervision and control of the military authorities. A considerable area has been cleared, drainage done and field crops grown. In 1915, a saw mill, located on the property was used to get out lumber for buildings. This mill was burned in March, 1916, and a portable mill belonging to the Provincial Government has been used during the year just closed.

In 1915, building operations were commenced under the supervision of Mr. J. B. Ker, foreman carpenter of the Central Experimental Farm, and good progress was made in constructing a horse barn and a cattle barn. A house for the man in charge of the Experimental Station live stock was also put up. The building work was continued in 1916 although greatly delayed in starting by a strike among the prisoners. The horse barn has been practically completed, but the cattle barn can only be finished this year owing to the severe cold making building operations impossible. A water system, with gasoline pump and water tank, has been installed,

and the various buildings piped for water supply. This will also afford much-needed fire protection.

Early this summer, Mr. Smith Ballantyne was appointed Foreman Manager of the Station, and under his supervision the work of clearing, breaking and draining has been actively carried on. Some 125 acres were under crop last year.

It will probably be impossible to carry on much experimental work

under present conditions, as the necessary degree of interest and care can hardly be expected from the interned prisoners, but it is hoped to have much of the preparatory work done by them, so that, when the Experimental Farms system obtains complete control and supervision of the Station, everything will be in readiness for the inception of full lines of experiment.

EXPERIMENTAL STATION FOR NORTHERN QUEBEC, SPIRIT LAKE, QUE.

IN December, 1914, the Director of Experimental Farms visited points along the Transcontinental railway for about 150 miles east of Cochrane, for the purpose of choosing a suitable site for an Internment Camp for alien enemies.

It was regarded as essential that the area chosen should be well-wooded, so as to permit of the prisoners' labour being profitably used at once. A number of sites were examined, but while the soils of some areas were found to be superior to that at Spirit Lake, the amount of standing timber on them was comparatively small. The Spirit Lake location, while in parts rather low and somewhat difficult to drain, has soils of good quality and eminently representative of those of that district. It was, moreover, the only available site near the railway filling the requirements as to timber.

The land was the property of the Provincial Government of the province of Quebec which deeded it, for a nominal sum, to the Federal Department of Agriculture, with the understanding that the area is to be used for Experimental Farm purposes.

The Station is situated in the townships of Trecesson and Dalquier. The area so far transferred amounts to about 1,200 acres and it is expected that this will be increased to some 1,600 acres in all.

Not all of this area is arable and there is a considerable frontage on Lake George included, which will probably be made into a sort of park or forest belt.

Considerable clearing, breaking and draining has been done during 1915 and 1916, the labour being performed for the most part by the prisoners. Some 150 acres of field crops have been grown. Clearing work will be continued during the winter and pulpwood cut, an engine and saw having been shipped in for the purpose. A pump and engine have been installed for water supply, a tank being already erected. Progress in farm operations has been considerably delayed by the prisoners' reluctance to work. No building work has yet been undertaken beyond the erection of a small greenhouse.

Early in the summer, Mr. Pascal Fortier was appointed Foreman-Manager of the Experimental Station.

Although it is unlikely that experimental work can be carried on to good advantage as long as prisoners' labour must, to a large degree, be depended upon, it is hoped that good progress with the preparatory work of clearing, breaking and draining will be made, and that building operations will be begun during the coming spring.

THE DIVISION OF HORTICULTURE

EXPERIMENTS WITH CHRYSANTHEMUMS

BY W. T. MAC'OUN, DOMINION HORTICULTURIST

THE greenhouses in the Horticultural Division at the Central Experimental Farm are devoted to experiments with fruits, vegetables and flowers, but during the months of October and November the chief attraction is the Chrysanthemums, and during the past autumn a very large number of people visited the Farm to see them. During the past three years

a plant, the remainder of the plants being grown in bush form. The flowers on single stems were, many of them, of immense size, running to from $8\frac{1}{2}$ to $9\frac{1}{2}$ inches in diameter. These, with the thousands of smaller flowers grown in bush form, made a display which is seldom equalled, and rarely surpassed anywhere. Some idea of the gorgeous display can be gathered from the excellent photo-



THE CHRYSANTHEMUM DISPLAY

a fine collection of varieties has been brought together for comparison and last year 100 sorts were tested. The main object is to learn the varieties which are most suitable for the florists' trade and most attractive as plants or cut flowers for the private dwelling. In 1916 about 1,200 plants were grown, of which 900 had but one or two flowers to

graph illustrating this article taken through the kindness of Dr. Frank T. Shutt. As the greenhouses at the Experimental Farm are open to the public, a special invitation was given through the newspapers for the citizens of Ottawa to visit the Experimental Farm to see the Show. Thousands availed themselves of the invitation. On the afternoon of

Sunday, November 5th, alone, it was estimated that about three thousand persons saw and enjoyed these lovely flowers.

Credit is given Mr. James McKee, foreman of the greenhouses, for the great skill shown in growing and arranging the chrysanthemums.

Some of the best varieties grown on single stems last year were:

White: William Turner, Mrs. G. Drabble, Naomah.

Yellow: Odessa, Yellow Turner, James Fraser, Aesthetic, and Daily Mail.

Pink: Meudon, Wells' Late Pink, Elberon.

Bronze: Harry E. Converse, Woodmason.

Among the best single chrysanthemums which were very popular are:

Pink: Mrs. Buckingham.

White: Garza, White Mensa, Highland.

Yellow: Yellow Mensa, Mrs. Loo Thompson, Gold Lock.

Bronze: Hilda Wells.

THE TOBACCO DIVISION

CANADIAN TOBACCOS AND THEIR POSSIBILITIES

BY F. CHARLAN, CHIEF OF THE TOBACCO DIVISION

AT the beginning of the year 1906, there were two chief tobacco-growing centres in Canada—one in Essex, mostly devoted to the production of the White Burley, and another in Quebec in the immediate vicinity of Montreal, north and south, where the bulk of the production was represented by several varieties of the seed leaf type generally known at the time under the denomination of pipe tobaccos.

As far as the latter were concerned they had been mostly used in the raw state, and had practically never been fermented. As a matter of fact, even at the present time a large proportion of pipe tobaccos is still used in that condition by some manufacturers.

The first real fermentation of Canadian tobacco was tried in the course of the winter 1905-1906, under the supervision of the Tobacco Division of the Department of Agriculture in co-operation with a Montreal manufacturer. It was ascertained that the aroma of the Quebec seed leaves had really nothing objectionable and that there were possibilities for using them for industrial purposes.

Owing to the comparatively low

prices generally paid by the manufacturer for his pipe tobaccos, it was understood from the beginning that it would not pay the packer to devote his attention exclusively to the grading and fermenting of tobaccos grown for that special purpose, but there were great possibilities in the production and the preparation for the Canadian market of some tobaccos of the binder type.

VARIETIES GROWN IN QUEBEC

Amongst the varieties grown in Quebec, one of them imported from Wisconsin, the Comstock Spanish, produces, especially in the district of the Yamaska valley, and on the light loams of the northern counties—Montcalm and Joliette—a leaf of fine texture and good shape that could be favourably compared with the Wisconsin binder, and even in some instances with the Connecticut binders. The attention of some Canadian manufacturers has been brought to the possibilities of that Canadian tobacco. This was the beginning of the present industry of the Canadian binder, packing houses being successively built at Farnham, St. Cesaire, St. Jacques, and even at

Joliette. At the present time the production cannot meet the demand, and the question is where to find in Canada more land suitable to the production of binder tobaccos.

IN ONTARIO

During that time in Ontario the growing of the White Burley, first chiefly located in Southern Essex, was extending eastward on the northern shore of Lake Erie and rapidly invading Kent. A little later some farmers from Ruthven, Ontario, trying some varieties of Virginia Bright found it possible to produce on certain sandy soils tobaccos that could be successfully treated by the flue-curing process, giving as a final result a product comparing favourably with some of the Southern Bright tobaccos.

The growing of Bright tobaccos, first located on some gravelly and light soils of Ruthven, was rapidly extended to the light sands right along the shore of the lake, where the best results have since been obtained. The area actually devoted in Ontario to the flue-cured tobaccos is increasing at a wonderful pace, and it is believed that in a very short time the total production of Bright tobaccos in Essex and Kent will be well above 2,000,000 pounds.

The only lacuna to be filled was the production of a Canadian filler that could be used in the manufacture of five-cent cigars to replace, to some extent, the special grades of Cuban or other foreign fillers imported for that special purpose.

The packers who had been handling and fermenting the Comstock Spanish from Quebec found themselves at a loss to use the short leaves, generally a little heavy in texture, and not large enough to be placed on the market as a binder. Those tobaccos were stemmed and re-sweated and a market opened for those Canadian fillers; however, some cigar manufacturers objected to the flavour of the Comstock Spanish fillers.

CLIMATIC INFLUENCE EXPERIMENTS

For the last five years experiments have been carried on by the Tobacco Division with a view to finding out what would be, amongst the varieties of tobacco grown abroad for that special purpose, those that would adapt themselves more readily to the climatic conditions of the tobacco-growing centres of the Dominion.

It has now been ascertained that all the Ohio fillers can be successfully grown in Canada. The best results so far have been obtained with the Aurora, a variety which has been discarded in Ohio, where it used to produce a leaf too heavy in texture, but produces in Canada a filler of good taste, good texture, of medium strength, and easy to grow and cure. The same can be said about a variety of Belgian tobacco "Obourg." That tobacco is easy to grow, yields well, is sufficiently early, not too strong, and produces a filler of nice aroma. So far the yield of the Cubans experimented with has been too small, and, at present prices, though those fillers are very aromatic, they cannot be produced profitably by the Canadian farmer. However, the last word has not been said, and possibly in a very short time some way will be found to increase the yield, and induce the Canadian grower to produce a type of filler for which there is such a large demand in the Dominion.

RE-ORGANIZATION OF THE DIVISION

In order to better meet the requirements of the tobacco industry in Canada the Tobacco Division has been recently re-organized. Two tobacco experts have been engaged. They are experienced men, familiar with all the phases of the production of Bright tobacco, whose practical knowledge has been supplemented by a thorough university training. One of them, Mr. Dudley D. Digges, has been appointed Superintendent of the Har-

row Tobacco Station, the other, Mr. H. A. Freeman, has been placed in charge of the field inspection work for Eastern Ontario and of the special study of the tobacco soils in Canada.

As to the production of the Seed Leafs in Quebec a great deal of experimental work has been carried on at Ottawa, and it is now ascertained that when treated in the proper way in the warehouse all the Canadian fillers of the varieties previously mentioned can be made sufficiently mild to be used in a comparatively high-grade cigar.

With regard to the production of the Canadian binders the problem was to establish varieties yielding a leaf of a somewhat thinner texture and more neutral taste than the Comstock Spanish. The Yamaska and the Big Ohio Sumatra seem to meet those requirements. They are good yielders, early growers, cure as easily as the Comstock Spanish, and can be used entirely in the manufacture of domestic cigars, as every leaf of sufficient size can make a binder while the short leaves can be used as a filler more neutral and much milder than the Comstock Spanish.

ACTIVITIES AND PROSPECTS

At the present time one might say that the Canadian tobaccos really represent an industrial product. Most of the tobaccos grown in the Dominion are produced for a special purpose and can find their way into some branch of the tobacco industry, provided, of course, that the crop is of the right quality and has been properly handled by the producer.

There remains to develop as rapidly as possible the results already attained. As far as Ontario is concerned the present organization of the Tobacco Division will enable it to devote more attention to the production of the flue-cured tobaccos and the White Burley.

The service of field inspection will

give the farmers an opportunity to discuss practical questions with the expert in the course of the latter's visit to his farm. Of course the inspectors cannot be everywhere at the same time, but they will endeavour to give their assistance whenever required.

In order to avoid a grave mistake still occurring so often a survey of the tobacco soils of Canada has been undertaken. Those soils will be classified as soon as possible according to the nature and the quality of the tobacco they can produce, and the farmer will be told with sufficient certainty what type or variety of tobacco will do best on his farm, or on the different types of soils on his farm. It is now pretty well admitted that although it is always possible to produce a crop of tobacco on any given piece of land, sometimes, when the soil is not suitable, the tobacco obtained is of such quality that it is not marketable, or only represents an inferior product which does not entitle the farmer to ask for a remunerative price.

THE BINDER TOBACCOS

As to the cigar tobaccos produced in Quebec the new types of binders originated by the Tobacco Division were grown for the first time last year on a commercial basis, thanks to the co-operation of the agricultural association of the Yamaska valley. The same co-operation is expected in the near future from a certain number of farmers in the northern district, and it is probable that before long the needs of the Canadian binder industry will be almost exclusively supplied by the Big Ohio x Sumatra and the Yamaska.

The classification of the tobacco soils when extended to the growing centres in Quebec will enable the farmer to make a distinction between those that should be devoted exclusively to the production of the binder tobaccos and those to be

devoted only to the production of the fillers, for which there is a large demand. Experience has taught us how the Canadian fillers must be handled in the warehouse and how we can meet the requirements of the trade.

The Canadian market is now ready to absorb all the White Burley and flue-cured tobaccos produced in Ontario, provided the crop is of good quality.

As to the cigar tobaccos the quality of the Canadian binders has been greatly improved during the

last few years, and will be still further improved rapidly, owing to the introduction of varieties better suited to the requirements of the trade. The proper selection of the soils devoted to the growing of tobacco in Quebec will also enable the farmer to produce a good type of fillers, for which there is an ever-increasing demand. The conclusion seems to be that with proper care of the crop and judgment in the selection of the soils devoted to the same there is the brightest future for the Canadian tobacco grower.

THE ENTOMOLOGICAL BRANCH

THE COST OF SPRAYING IN THE CONTROL OF THE PEAR THRIPS IN BRITISH COLUMBIA

BY A. E. CAMERON, M. A., D.Sc., AND R. C. TREHERNE, B.S.A., FIELD OFFICERS, ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA, AND E. W. WHITE, B.S.A., INSPECTOR, DEPARTMENT OF AGRICULTURE FOR BRITISH COLUMBIA, VICTORIA, B.C.

SOME facts concerning the actual cost of the spraying operations have been sufficiently well-established to be worthy of record, and to serve for a guide for the future.

Fully 138 acres, comprising 11,569 bearing fruit trees of mixed varieties, received applications of spray mixtures in the spring of 1916 with hand and power outfits in the campaign against the thrips. On 72 of these acres, comprising 6,441 trees sprayed by power machines, records of the amount of material applied were kept, its cost and the time required to make the applications. Table 1, which follows, shows the actual amounts of nicotine sulphate (Black Leaf 40), whale oil soap and arsenate of lead applied to the number of trees hereafter mentioned. Similarly, the actual cost of these spraying materials per orchard, together with the number of gallons (U.S.) of mixture applied and the time required to carry out the operations are detailed. The time occupied in making these applications includes

that required for refilling the tanks and repairing breakages; allowance is also made for the sundry halts found necessary for cleaning nozzles and strainers during the course of the operations.

Under the item "cost of labour", \$5.00 per eight-hour day was actually paid by those orchardists who found it necessary to hire teams and teamsters to haul the power machines in their orchards. Allowances, therefore, at this rate, are made in those cases where outside help was employed. Where orchardists had their own horses and drove the teams themselves or employed boy labour, allowance is made at the rate of \$4.00 per eight-hour day. Two nozzle-men were attached to each power machine, and in this case, when Chinese labour was employed, allowance is made at the rate of 10 cents per hour, the actual price paid; but when the orchardists themselves handled the nozzles or obtained their neighbour's assistance, allowance is made at the rate of 25 cents per hour.

Under the conditions that prevailed in the campaign during the past spring, a qualified engineer was detailed by the Provincial Department of Agriculture to take charge of the machines. But under strictly practical conditions the employment of an engineer is superfluous as the machines may easily be managed by the teamster or by one of the nozzle men. Consequently, the cost of the engineer is not

incorporated in the table. The cost of labour, therefore, refers only to the employment of a team of horses, a teamster and two nozzle men.

No allowance has been made in Table 1 for repairs, depreciation of machines, or for the principal or interest on the investment carried in the outfits. Consequently, due allowance must be made for these items together with the charge for oil, gasoline and repairs.

TABLE 1.—THE ACTUAL COST OF PRACTICAL SPRAYING OPERATIONS BY POWER-MACHINES IN CERTAIN ORCHARDS IN THE SAANICH PENINSULA, B.C., DURING SPRING 1916, IN CONTROL OF THE PEAR THRIPS

	ORCHARD NUMBER				
	1	2	3	4	5
<i>1st Spraying as buds burst:</i>					
Age of trees, in years	10-15	7-10-16	11-14	8-9-18	8-20
Number of trees sprayed	1165	730	403	323	1142
Number of U. S. gallons applied	3200	1400	1800	1100	1800
Time required for operations, in hrs.	17	12 $\frac{1}{4}$	14 $\frac{1}{4}$	9 $\frac{1}{4}$	15 $\frac{1}{2}$
Amount Black Leaf 40 used, in pts.	18	10 $\frac{1}{2}$	13 $\frac{1}{2}$	8 $\frac{1}{4}$	12 $\frac{1}{2}$
Amount whale oil soap used, in lb.	188	70	90	55	90
Amount arsenate of lead used, in lb.					
Total cost of spraying materials	\$32.94	\$17.32 $\frac{1}{2}$	\$22.27 $\frac{1}{2}$	\$13.61 $\frac{1}{4}$	\$22.27 $\frac{1}{2}$
Total cost of labour	14.45	13.78	13.89	9.02	16.37 $\frac{1}{2}$
Total cost to orchardist	47.39	31.10 $\frac{1}{2}$	36.16 $\frac{1}{2}$	22.63 $\frac{1}{4}$	38.65
Estimated cost per tree	4 cents	4.3 cents	8.9 cents	7 cents	3.3 cents

	ORCHARD NUMBER				
	1	2	3	4	5
<i>2nd Spraying as blossoms show pink:</i>					
Age of trees, in years	10-15	7-10-16	11-14	8-9-18	6-10
Number of trees sprayed	1170	599	316	193	898
Number of U. S. gallons applied	2000	1400	1600	600	1250
Time required for operations, in hrs.	15 $\frac{1}{2}$	10 $\frac{3}{4}$	11	4 $\frac{1}{2}$	11 $\frac{1}{2}$
Amount Black Leaf 40 used, in pts.	15	10 $\frac{1}{2}$	12	4 $\frac{1}{2}$	9 $\frac{1}{4}$
Amount whale oil soap used, in lb.	66	70	80	30	64 $\frac{1}{2}$
Amount arsenate of lead used, in lb.	80	56	64	24	50
Total cost of spraying materials	\$32.31	\$24.24 $\frac{1}{2}$	\$27.48	\$10.30 $\frac{1}{2}$	\$21.58
Total cost of labour	11.23	12.09	10.72 $\frac{1}{2}$	4.38 $\frac{3}{4}$	10.72
Total cost to orchardist	43.54	36.33 $\frac{1}{2}$	38.20 $\frac{1}{2}$	14.69 $\frac{1}{4}$	32.30
Estimated cost per tree	3.8 cents	6 cents	12 cents	7.6 cents	3.6 cents

	ORCHARD NUMBER			
	1	2	3	4
<i>3rd Spraying, after blossoming:</i>				
Age of trees, in years	10-15	16	11-14	6-20
Number of trees sprayed	971	241	374	375
Number of U. S. gallons applied	2600	1000	2000	800
Time required for operations, in hrs.	19	7 $\frac{1}{4}$	14 $\frac{1}{4}$	9
Amount Black Leaf 40 used, in pts.	19 $\frac{1}{2}$	7 $\frac{1}{2}$	15	6
Amount of whale oil soap used, in lb.	104	50	100	40
Amount of arsenate of lead used, in lb.	104	40	80	16
Total cost of spraying materials	\$43.09 $\frac{1}{2}$	\$17.17 $\frac{1}{2}$	\$34.35	\$11.82
Total cost of labour	13.77 $\frac{1}{2}$	8.15 $\frac{1}{2}$	13.89	9.80
Total cost to orchardist	56.87	25.33	48.24	21.62
Estimated cost per tree	5.8 cents	10 $\frac{1}{2}$ cents	13 cents	5.7 cents

This table represents the actual amount of spraying mixture applied and the cost of the operations as calculated from results of the operations which were carried out on a strictly commercial scale. Differences are noted throughout the table in the estimated cost of the applications. For instance, it cost orchardist No. 1, 13.6 cents per tree, while it cost orchardists 2, 3 and 4, respectively, 20.8, cents 33.9 cents and 20.3 cents, per tree for the three applications. On the basis of an acre, the differences become more marked. This is accounted for by the variation in the size and condition of the trees in the different orchards, by the varying number of trees planted to the acre, by the cost

of labour, by the accessibility of water and by the thoroughness of application. All of these considerations naturally increase or decrease the cost of spraying. The table while it does not indicate comparative data on a uniform basis, is of value in that it shows variations in the cost of spraying under the varying conditions that prevailed.

Owing to the fact that the trees mentioned in Table 1 were mixed, both as regards variety, size and age, it is impossible to estimate the amount of spraying mixture applied to each group of trees with accuracy. To determine this point, a number of trees of known variety, size and age were selected and a careful estimate made, as Table 2 will show.

TABLE 2.—THE ACTUAL NUMBER OF GALLONS (U. S.) APPLIED TO FRUIT TREES OF KNOWN VARIETY, SIZE AND AGE

VARIETY	Condition of Bud or Leaf Development	Number of Trees	Age in Years	Spread and Height in Feet	Actual Number Gallons Applied	Number of U. S. Gallons Applied per Tree
Mixed pears..	Buds bursting	30	20	10x18	100	3 33
Mixed apples.	Buds well burst	740	10	8x10	1000	1 35
King apples ..	" "	45	11	12x12	200	4.44
Mixed apples..	Blossoms showing pink	635	9	9x9	700	1.10
Duchess apples.	" "	93	10	10x10	200	2.15
Olivet cherries.	Blossoms showing white	66	13	12x12	200	3.03
King apples	Blossoms falling	55	12	12x12	200	3.6
King apples .	"	76	12	12x12	200	2.6
King apples.....	"	68	12	12x12	200	2.9
Wealthy apples..	"	80	11	8x14	200	2.5
Duchess apples.	"	85	11	7x12	200	2.3
Mixed apples..	"	35	15	14x14	200	5.7
Mixed apples.	"	36	20	12x12	200	5.5
King apples	"	28	11	12x12	200	7 1

This table, based on data recorded at the time of the operations, clearly shows the quantity of material required for effective spraying and will serve as a guide for future treatments.

The cost of a gallon of the soap-nicotine mixture is shown in Table 3. Miscible Oil No. 2 was used only in experimental plot during the course

of the spring operations, but for the sake of comparison, the cost per gallon of this material is included in the same table. The cost of Miscible Oil No. 2 consigned and delivered to the orchard was 55 cents per U.S. gallon. Black Leaf 40 was also incorporated in the miscible-oil mixture, to increase the efficiency of the spray.

TABLE 3.—COMPARISON IN COST PER GALLON BETWEEN WHALE OIL SOAP AND MISCIBLE-OIL MIXTURES

	Miscible Oil No. 2		Whale Oil Soap		Black Leaf 40		Total Cost per 200 U. S. Gallon	Cost per Gallon
	Amount in Gallons	Cost	Amount in Lb.	Cost	Amount in Pints	Cost		
1st spraying...	5	\$2 75	10	.60	1 1½	\$1 25 1.87	\$4.00 2 47	2 cents 1.2 "
2nd spraying ..	3	1.65	10	.60	1 1½	1.25 1.87	2 90 2 47	1.4 " 1.2 "
3rd spraying ...	2	1.10	10	.60	1 1½	1 25 1.87	2 35 2 47	1.1 " 1.2 "

It is necessary to reduce the quantity of miscible oil in the 2nd and 3rd sprayings. Hence, while the proportions in the soap-nicotine mixture remain constant throughout, the oil-nicotine mixture varies. This results in a difference in cost. It can be seen from the above table that the oil mixture in the strength required for the first spraying is more expensive than the soap mixture, but is cheaper in the third application.

Some useful information was also gathered this spring on the comparative value of hand-power spraying machines and gasoline-power outfits. If there is one point more than any other which must be borne in mind in controlling the pear thrips, it is the promptness required in spraying a given area. According to circumstances, dependent on the weather, it has been found that a delay of four, three, or even two days, in the time of application may destroy the possibility of good results.

It was noticed that a hand Spray-motor pump fitted to a 40-gallon barrel, with one lead of hose, put on 225 gallons of spray mixture in an eight-hour day; a Bean Magic hand-pump No. 9, attached to a 60-gallon barrel, put on 375 gallons in a day, with one lead of hose, and a Bean Magic hand-pump No. 9, attached to two 50-gal. barrels, with two leads of hose, applied 437½ gallons per day; a Triplex Bean motor-power outfit is capable of applying 1,200 gallons in an eight-hour day, allowing

60 minutes for spraying and 20 minutes for refilling each tank. It is permissible to compare these different machines as the circumstances attending their use were similar. From this it may be inferred that a power-machine is practically essential in a large orchard to obtain good results in combatting the pear thrips.

Another important point to remember is rapidity of application necessary to reduce the cost of spraying once the machines are in operation. It was estimated that it cost, in labour charges, from one to two cents per minute for each minute the power machines were operating. For every minute, therefore, that the machines were not spraying or the men actually engaged in some proceeding incidental to spraying, the same cost prevailed. It can be seen, therefore, that accessibility of water and rapidity of action with the avoiding of unnecessary delays, largely govern the cost.

It was observed that provided the spraying by motor-power outfit was done expeditiously, the quantity of material delivered in comparison to that applied by a hand-power machine to the same number of trees was practically the same for both.

It is hoped that the above information obtained during the course of the spring operations carried on under strictly commercial methods, will prove of use to growers in combatting orchard pests in the future.

THE FRUIT BRANCH

INSPECTION AT POINT OF SHIPMENT

BY K. B. ROBINSON

STARTED in Nova Scotia in 1914, tried tentatively in Ontario and British Columbia in 1915, and continued in all the great fruit producing provinces this year, it is still somewhat early to speak of results in connection with the system of inspection at the point of shipment since each of these seasons has been unusual for one reason or another. Possibly, the usual or normal season is an anomaly, but certainly, 1914, owing to the unsettled conditions due to the commencement of the war; 1915, with its continued difficulties both in production and marketing, and last year with a light crop of the poorest quality ever produced in Ontario, have all been far removed from what we have in the past considered average or normal conditions.

But from the spirit in which this change in the method of inspection has been met, not only by packer and growers, but by dealers and consumers as well, it would appear that "inspection at point of shipment" has come to stay. And perhaps just in a year like this its value is particularly noticeable. The crop in Ontario being generally of poor quality, thus making the output of the higher grades very short and consequently high priced, the temptation is of course to run just as much fruit as possible in the No. 1 and No. 2 grades, without paying too much attention to the standards for these grades as laid down in the Fruit Marks Act, but the constant presence of our inspectors in the orchards and at the packing houses has been a restraining influence. Instead, therefore, of there being a very great many more violations of

the law than usual, as might have been expected, the result of the poor quality of the crop has been that an unusually high percentage of the apples have been packed as No. 3's (the only requirement for this grade being that it is honestly faced), while the No. 1's and 2's which have been put up are remarkably true to grade.

In many cases we find that it is even yet a matter of lack of education—and not a desire to defraud—that induces a packer to put No. 3 apples in a No. 2 barrel or No. 2 apples in a No. 1 barrel, and very often our inspector, by being on hand when the first few barrels are packed, is able to set the whole gang of packers right, and thus possibly several thousand barrels will be put up in conformity with the law, whereas otherwise, the faulty grading or packing of the first few barrels would have been continued through all the work done by that particular gang. Hundreds of inspection reports have come into the office during the past few months containing some such remark as: "Examined six barrels from a lot of 60 and found them off colour and too small for No. 1. Owner reduced grade on whole lot to No. 2." In such a case it will readily be seen that not only does the owner have an opportunity of seeing what is wrong with his fruit, but he is given an opportunity to rectify it, and thus protect his reputation, which would suffer if these barrels went out branded "Falsely marked." In addition, all the persons who subsequently handle this lot are also protected as the grade marks upon it now properly represent the contents.

One difficulty, however, in regard to this system of inspection is the possibility of it being abused by certain shippers who may think: "We will try this car as No. 1, and then if the Inspector won't allow it to pass we can easily reduce the grade to No. 2." For this reason it is proposed early next season to write to the packers and shippers noting that more will be expected in the matter of living up to the requirements of the law from those to whom the inspectors have accorded the privilege of reducing the grade marks

upon shipments last year than from those who have not had this advantage. Attention will also be drawn to the fact that because the lowering of the grade marks on a lot is permitted, that does not necessarily preclude the possibility of a prosecution if it is found that shippers are taking advantage of the new system. There is nothing whatever to prevent any information being laid against a man if a violation is discovered in connection with his fruit, even though he may reduce the grade on the packages in question.

FRUIT MEETINGS

IN addition to the actual work of inspecting fruit and fruit packages, members of the Fruit Branch do a great deal of work of an educational character by attending fall fairs and fruit meetings of various kinds. During the past few months the two most important meetings of this kind held in Canada were the New Brunswick Apple Exhibition and the Quebec Pomological Society annual meeting. At the former, held in St. John, October 31st to November 3rd, the Commissioner had accepted an invitation to be present, but owing to illness he was obliged, at the last moment, to send Mr. C. W. Baxter, Chief Fruit Inspector for Quebec and Eastern Ontario, to represent him. In addition, Mr. P. J. Carey, Packing Expert for this Branch, and Mr. G. H. Vroom, Chief Fruit Inspector for the Maritime Provinces, attended the exhibition, and did what they could to assist the provincial authorities in making it a success. Mr. Carey held informal packing classes during the exhibition. Mr. Baxter gave a short address at the opening of the exhibition, and at the annual meeting of the New Brunswick Fruit Growers' association, held at the same time, the three representatives of the Fruit Branch were asked to take part

in the discussions. In addition, they assisted in the work of judging, which was no sinecure owing to the many and varied exhibits, which were of such excellent quality and so highly coloured in practically every case that the work required the exercise of exceedingly nice judgment. The exhibits were, indeed, a revelation as to the possibilities of fruit growing in New Brunswick, and Messrs. Carey and Baxter on their return to Ottawa both expressed themselves as convinced that the famous Annapolis Valley would very soon have a keen competitor in the St. John River district.

At the annual meeting of the Quebec Pomological Society, held at Macdonald College, December 5th and 6th, the Commissioner gave an address on "The 1916 Fruit Crop of Canada" and Chief Inspector Baxter spoke on "The Benefits of Inspection to our Fruit Growers." The meeting was well attended, and the excellent display of fruit showed that even in this season when scab has been particularly rampant and in a district growing the varieties most susceptible to it, well sprayed orchards produced crops absolutely clean and of the highest quality and colour.

By invitation of the New Hamp-

shire Horticultural Society, Mr. G. H. Vroom, Chief Fruit Inspector for the Maritime Provinces attended their State Exhibition at Keene, N.H., October 25th, 26th and 27th, in order to act as judge of the fruit exhibits and to give an address on fruit conditions during 1916.

The Virginia State Horticultural Society also invited a member of the staff, Mr. P. J. Carey, Packing Expert, to attend their annual meeting at Roanoke, Va., December 5th, 6th and 7th, and give them an address on the grading and packing of fruit. Mr. Carey reports that the exhibition of fruit and all kinds of machinery in connection with orchard work, including spray mixtures and grading machine, filled a huge building and formed a very fine educational feature of the meeting. Mr. Carey was also particularly impressed by the large number of growers who attended the meeting from all parts of the state, showing

by their discussion of the different points raised during the sessions an intelligent interest in their industry that might well be emulated by our Canadian fruit men. At many meetings on this side of the line it very often appears that the few large and more successful growers come year after year, and that the men with the smaller holdings, those who are perhaps most in need of rubbing up against their competitors and learning of new and improved cultural, packing, shipping and marketing methods, feel that these meetings are not intended for them. Probably the most important feature of the Virginia meeting was the drawing up of a law to regulate the packing and marking of fruit in that state. With his experience of some fifteen years under our Canadian Fruit Marks Act, Mr. Carey was in a position to give valuable advice to the fruit men of Virginia in this connection.

THE HEALTH OF ANIMALS BRANCH

THE SUPPRESSION OF GLANDERS

BY C. D. MCGILVRAY, M.D.V., CHIEF INSPECTOR FOR MANITOBA, WINNIPEG, MAN.

IT has long been recognized that the disease known as glanders was one which caused serious losses among horses and mules. The occurrence of Glanders has also a special significance, owing to the danger of human beings contracting the disease. Two cases of glanders in man were observed by the writer, during the year 1905, in Manitoba. Death occurred in both cases in the course of three weeks' illness.

In order to assist in the better understanding of the methods required for the stamping out of glanders, it would seem proper to first make some reference to the nature of the disease and how it may be contracted and spread. The disease known as glanders is essen-

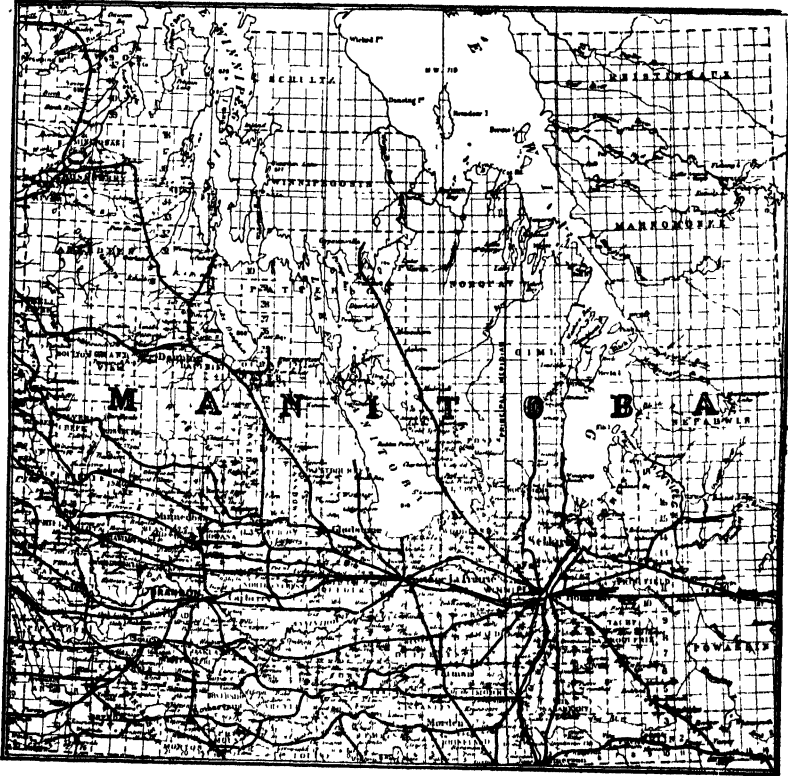
tially a contagious disease, or one which is catching from one horse to another if either is affected. It is caused in all cases by a germ known as the *Bacillus Mallei* gaining entrance to the body. The germs of the disease may be transmitted from an affected horse to another either by being in direct contact with each other, or by indirect means, as through the use of articles and utensils, such as harness and water pails, previously used by a diseased animal. Likewise the disease may be contracted in stables or sheds in which glandered horses have been. In many cases, healthy horses contract the disease by consuming food or drinking water which has become contaminated by the germs dis-

charged from the nostrils of glandered horses. The disease is contracted more readily, and spreads very rapidly, among horses which are kept in dark, poorly ventilated and crowded stables, owing to the air, food-stuffs, bedding and stalls becoming badly contaminated with the germs expelled from time to time by the diseased animals. While the disease spreads less rapidly where

among horses on the open ranges of the West.

THE DETECTION OF GLANDERS

In referring to the detection of glanders, it should be clearly understood that horses may be affected with the disease without showing any noticeable outward signs of it for a considerable length of time. These



MAP SHOWING OUTBREAKS OF GLANDERS IN MANITOBA DURING 1905
The mark X indicates the location of the various outbreaks dealt with that year

horses are kept under good sanitary stable conditions, or where they are kept most of the time at pasture, nevertheless, it must be acknowledged that even under these apparently favourable conditions, the disease, when present, is found to spread to a considerable extent. This is clearly demonstrated by the occurrence and spread of glanders

are the so-called "Occult cases," or those in which the disease remains in a concealed state in the body, such as in the air passages and lungs. In horses which are showing signs of the disease they are usually affected with an old standing discharge from the nostrils, either from one or both. The discharge from the nostrils may appear gradually and, for a time,

may be quite slight, and is peculiar in that it is of a sticky nature and adheres around the nostrils, giving them a dirty appearance. At other times it may be quite profuse from the nostrils and ulcers may be present inside the nostrils. As a rule the discharge from the nostrils of a glandered horse does not have a very offensive smell and this should not mislead one. It will be noticed also that a firm lump, the size of a walnut, or larger, is present on the inner side of the lower jaws. This lumpy condition is very characteristic, being invariably present in horses having a glanderous discharge from the nostrils. Some horses show the disease by the appearance on the body, particularly on the hind legs, of sores known as "Farcy Buds." This form of the disease is sometimes called Farcy, which means glanders affecting the skin.

In view of the fact that horses may be affected with glanders for a considerable time without showing any noticeable outward signs of the disease, some satisfactory means must therefore be employed to detect the presence of the disease while in this "occult" or concealed state in the body. For this purpose use is made of what is termed the Mallein test. The substance used for this test is a product known as Mallein, and which, from the method of its preparation, does not contain any living germs and, therefore, its use cannot cause the disease. It is harmless when used on healthy animals and produces little or no disturbing effects in them. When used on glandered horses whether showing outward signs of the disease or not, it produces in them a marked effect, which is termed a "reaction." The nature of this reaction depends on the method used in applying the test, there being two in general use, either of which is satisfactory. They are known respectively as the Ophthalmic Mallein test and the Subcutaneous Mallein test. The Ophthalmic Mallein test is commonly

known as the eye test, as by this method the Mallein is placed within the lower eyelid of one eye. The reaction effects become noticeable in the course of twelve hours or more, by the appearance of a mattery discharge from the eye, and reddening and swelling of the eyelid. In the application of the Subcutaneous Mallein test, the dose of mallein is injected beneath the skin with a hypodermic syringe, the usual place for making the injection being on the side of the neck. The reaction effects consist in a marked rise of temperature and the appearance of a hot painful swelling on the neck where the injection was made. The rise of temperature and swelling of the neck become manifest in from ten to twenty hours after the injection. Horses which show a characteristic reaction to either of these tests should be considered as glandered, whether showing signs of the disease or not, and especially where there is suspicion of exposure to the disease.

METHODS USED TO STAMP OUT GLANDERS

The methods used to stamp out glanders among horses are the same in all parts of Canada, as the control of the disease comes under the Health of Animals Branch of the Department of Agriculture. The procedure followed, in general, is that all horses and mules affected, or suspected of being affected, with glanders, are inspected and submitted to the Mallein test by experienced Veterinary Inspectors employed by the Department. All animals which definitely respond, or react, to the test are destroyed and their carcasses properly disposed of by burying or burning up completely. The stables and other places occupied by the diseased animals are then thoroughly cleaned and disinfected, together with all articles and utensils which have been in use, under the supervision of an inspector. The

remaining animals are then held under quarantine restrictions for a period of fifteen days, or more, for further inspection and test. If at this second inspection and test no further reactors are detected, the premises are released from quarantine. On the other hand, should any react, they are destroyed and the premises again cleaned and disinfected. Compensation is paid by the Department to owners for animals destroyed for glanders at the rate of two-thirds the animal's value, with a maximum valuation of \$200 for grade animals and \$500 for pure-breds.

With a view to tracing the source of the disease in outbreaks, and prevent its spread, careful enquiry is made as to possible contact, or indirect exposure, of other horses. Steps are then taken to immediately deal with all horses and premises to which suspicion may thus be attached. While this involves a considerable amount of effort and detail work, it is however an essential factor in the suppression of glanders.

In order to prevent the introduction of glanders into Canada from other countries, it is required that all horses and mules entering from the United States must either be accompanied by a satisfactory certificate of Mallein test, or else be submitted to the Mallein test by Veterinary Inspectors of the Department stationed at the port of entry.

As an example of the good results following the carrying out of this policy in dealing with glanders, reference to the occurrence of the disease in Manitoba may be of interest.

While it was necessary to destroy a large number of diseased horses during the first few years, the decrease in the number of cases became rapidly, and noticeably, less, showing that the methods followed were effective in stamping out the disease.

The subjoined statistical information shows the progress made during a period of eleven years, extending from 1905 to 1916:—

Year	Horses tested	Reactors destroyed	At a cost of
1905	1,777	871	\$69,053.27
1906	1,403	336	27,207.37
1907	3,065	199	17,303.11
1908	1,319	124	9,304.91
1909	813	70	5,391.27
1910	380	19	1,536.66
1911	930	38	3,389.98
1912	993	24	2,030.00
1913	247	20	1,780.00
1914	733	45	5,313.33
1915	177	4	443.33
1916	37	Nil	Nil

NOTE:—In addition to the horses shown above, we have also tested, during the same period, at boundary points in Manitoba, 22,481 horses and mules, entering from the United States.

INFRACTION OF QUARANTINE

BEFORE two Justices of the Peace a farmer at Wood Mountain, Sask., was recently fined \$25.00 and costs, in all \$36.50, for infraction of the quarantine. It was proved that this man

had imported a number of sheep from the United States, and subsequently had surreptitiously removed them from quarantine to his own farm.

THE LIVE STOCK BRANCH

CO-OPERATIVE WOOL SALES

BY T. REG. ARKELL B.S.A., CHIEF OF THE SHEEP DIVISION

PRIOR to the investigation by the Live Stock Branch of the conditions affecting the sheep and wool industry and to the subsequent assistance rendered the wool growers in marketing their wool, this commodity has been sold under very unsatisfactory methods. Under the conditions obtaining Canadian woollen manufacturers were able to purchase their wool to better advantage on outside markets owing to the fact that they were able to secure a uniform and dependable quality and a much cleaner product. The manufacturer further objected to Canadian wool since it was neither classified nor graded. When purchasing it he was obliged, therefore, to buy grades which he did not require as a result of which he found himself over-stocked with classes of wool not required by him in his special line of business.

In connection with the efforts of the Live Stock Branch in conducting a propaganda for more and better wool, Wool Growers' Associations were organized and an appeal was made to the sheep-raisers to introduce modern methods of preparing the wool for market. Wool prepared by members of these associations was then classified by expert wool graders supplied free of charge to the associations by the Live Stock Branch. As a result of this work, which has now been in progress for three years, wool is eagerly sought after by dealer and manufacturer and commands a price greatly in advance of what breeders were able to obtain when following the old unsystematic methods.

Wool growers' associations are now

organized in every province of the Dominion. In order to convey some idea of the manner in which the co-operative sales of wool are appreciated by the wool growers of the Dominion, the following review has been prepared of the progress of the work since its inception. In the first year, 1914, there were nine associations through which 201,217 $\frac{3}{4}$ lb. of wool were graded with an average price per lb. throughout the Dominion of 20.7c. The total revenue received from sale of same was \$20,393.58. In the second year, 1915, eleven associations offered 322,905 lb. of wool for grading, the average price per lb. obtained being 27.2c., while the total revenue amounted to \$88,056.49. In the third year, 1916, twenty-six associations made application for their wool to be graded by this Branch. A total of 1,726,805 $\frac{1}{2}$ lb. of wool was graded, an average price of 32.83c. being obtained throughout the entire Dominion.

Wools east of Port Arthur brought an average of 41.01c. per lb. while wools west of that point brought an average of 31.53c. The difference in price per lb. may be explained by the greater shrinkage in the wools of Western Canada and the closer proximity of Eastern domestic wools to the woollen markets of this country. It is worthy of note that over \$500,000 has been received by the sheep-raisers of Canada during the present year through the medium of the co-operative wool sales.

Observations made regarding the advantages to be obtained by the wool grower through the sale of wool in a graded condition reveal the fact

that, in many instances, where wool disposed of through co-operative association brought 36c. per lb. a similar grade or quality of wool, grown in the same vicinity, marketed in a haphazard condition at the farmer's door, or in the country store, returned the producer only 28c. per lb.

Another step forward in the co-operative movement, in association with the co-operative sale of wool, has been the introduction of lamb sales by the Live Stock Branch. Recently in the county of Antigonish, N.S., 1,200 head of lambs

were disposed of by co-operative sale and it is understood that 1,500 lambs are still in the finishing stage on the farms to be disposed of in the same manner. The association was well satisfied with its first sale. An average price per lb., live weight, of 7½c. was obtained for the entire number offered, while for the lambs, sold outside the association, 7½c. per lb. was the highest price paid, this being only, however, for the best quality of lambs. The males, of which there was a large proportion, as also the inferior stock, brought much less per lb.

WOOL GRADED BY LIVE STOCK BRANCH, 1916

EASTERN CANADA

NAME OF ASSOCIATION	No. of Lb. Graded	Average Price Per Lb.	Revenue
Prince Edward Island Wool Growers' Association	27,666	38¾	\$10,720 58
Antigonish Wool Growers' Association, N.S.	17,388½	41⅛	7,151 02
Guysboro Wool Growers' Association, N.S.	1,119½	41⅛	460 39
Kent & Westmoreland Wool Growers' Ass'n., N.B.	1,804	38	685 52
Sussex & Studholm Wool Growers' Association, N.B.	3,257	38½	1,253 95
Argenteuil Wool Growers' Association, Que	10,769½	40	4,307 80
Beauharnois Wool Growers' Association, Que	13,587	41 1	5,584 26
Bedford Wool Growers' Association, Que	15,091	41 5	6,262 77
Compton Wool Growers' Association, Que	24,387½	42 4	10,340.30
Pontiac Wool Growers' Association, Que	52,545	42 8	22,489 26
Richmond Wool Growers' Association, Que	17,664¾	41 7	7,366 20
Sherbrooke Wool Growers' Association, Que	16,024	42 3	6,778 15
Stanstead Wool Growers' Association, Que	14,102	42 3	5,965 15
Megantic Wool Growers' Association, Que	3,909¾	42 5	1,661.64
Manitoulin Island Wool Growers' Association, Ont.	17,990	35.	6,296 50
Total	237,305½	41 01	\$97,323.49

WESTERN CANADA

NAME OF ASSOCIATION	No. of Lb. Graded	Average Price Per Lb.	Revenue
Elkhorn Wool Growers' Association, Man	9,240	31 9 c.	\$ 2,947.56
Manitoba Sheep Breeders' Association, Man	141,831	31.9 c.	45,244.09
Saskatchewan Wool Growers' Association	176,556	32 41c.	57,321.24
Alberta Provincial Sheep Breeders' Ass'n., (Edmonton)	51,859	30 61c.	15,878.63
Alberta Sheep Breeders' Association, (Calgary)	280,515	29.9 c.	83,867.43
Cardston Wool Growers' Association, Alta	129,742	32. c.	41,517.44
Lacombe Wool Growers' Association, Alta	36,107	31 14c.	11,444.63
Pincher District Wool Growers' Association, Alta	20,246	32. c.	6,478.72
Southern Alberta Wool Growers' Ass'n., (Lethbridge)	587,747	31.9 c.	187,891.29
Vermilion Wool Growers' Association, Alta	33,901	31.5 c.	10,678.82
Vancouver Island Flock Masters' Association, B.C.	21,756	31.5 c.	6,853.14
Total	1,489,500	31.53c.	\$469,622.99

CONSERVATION OF LIVE STOCK IN WESTERN CANADA THE CARLOT POLICY

BY P. E. LIGHT, B.S.A., INTELLIGENCE OFFICER, MARKETS DIVISION.

THE Carlot Policy of the Dominion Department of Agriculture, administered through the Live Stock Branch during the months of October and November last, in the western provinces of Canada, has produced results of a most satisfactory nature, not only from the standpoint of the conservation of our live stock resources, but also in the general attitude of the country toward the future possibilities of one of the basic industries of agriculture.

The policy was born of the necessity of conserving the live stock resources of the Dominion by discouraging the exportation and slaughter of breeding and feeding cattle; a condition that was fast draining our breeding herds and growing stock to a most dangerous extent. Under the provisions of the policy, which is still in operation, the Branch pays reasonable travelling expenses of farmers in going to the stock-yards or other buying points in Western Canada to purchase cattle for breeding and feeding purposes, either for their own use or on co-operative order for their neighbours. Officers of the Live Stock Branch in charge of the campaign made their headquarters at Winnipeg, while other officers were in close touch with the markets at Calgary and Edmonton. Officers supplemented the work throughout the western provinces, visiting the different localities with a view to stimulating the purchase of steers and heifers, and personally meeting those in a position to carry breeding and feeding cattle over the coming winter. A pamphlet prepared by the Live Stock Branch setting forth the situation was simultaneously dis-

tributed throughout the West with the assistance of the banks, who ably supported the policy throughout, and encouraged farmers to purchase cattle by offers of credit facilities to responsible parties.

That this policy has been acceptable to the farmers of the western provinces and a success for the purpose for which it was adopted, is clearly indicated by the large numbers who are taking advantage of the policy, but more so by the numbers of cattle being shipped to the farms of Western Canada instead of going south into the United States or else finding an untimely end at the shambles. During the months of October and November in which the policy was first in operation, the shipments to United States of this class of cattle were practically cut in two in comparison with the similar period of last year, while five times as many cattle were shipped to points in Western Canada during October and November last year as was the case during the same two months of 1915. The effectiveness of the effort made to retain breeding and feeding cattle within the Dominion is most apparent when it is stated that such considerable stimulus has been given to the Live Stock industry, as has not been known before in the western provinces.

STOCKER AND FEEDER MOVEMENT FROM UNION STOCK YARDS, ST. BONIFACE, MAN.

The following summary of the stocker and feeder movement for October and November out of the Union stock yards, St. Boniface, Manitoba, gives an indication of the effective working of the policy:—

STOCKER AND FEEDER MOVEMENTS.

	1915		1916	
	October	November	October	November
Stocker and Feeder Receipts.	10,579	7,326	11,528	9,595
Shipments to Western Canada.	810	1,962	6,017	7,140
Shipments to United States.	9,769	5,464	5,511	2,455
Percent of total receipts shipped to Western Canada.	7.6 (%)	2.64 (%)	52.2 (%)	74.4 (%)
Percent of total receipts shipped to United States.	92.3 (%)	73.6 (%)	47.8 (%)	25.6 (%)

	1915	1916
	Two Months' Period	Two Months' Period
Total Shipments to Western Canada.	2,772	13,157
Total Shipments to United States.	15,223	7,966
Percent of total receipts shipped to Western Canada.	17.1 (%)	63.3 (%)
Percent of total receipts shipped to United States.	82.9 (%)	36.7 (%)

THE SEED BRANCH

FIELD ROOT AND VEGETABLE SEED GROWING IN BRITISH COLUMBIA

BY JAS. R. FRYER, M.A., SEED ANALYST, CALGARY LABORATORY

IN the fall of 1914, on the outbreak of the war, Canadian agriculturists became concerned for their future supply of those kinds of field root and vegetable seeds which had hitherto been almost entirely imported from European countries. The Dominion Seed Commissioner accordingly started a vigorous campaign to encourage farmers and gardeners to grow their own seeds, particularly those kinds in which a shortage was anticipated, and for the growing of which the Minister of Agriculture had authorized the payment of subventions. Western officers of the Seed Branch have encouraged seed growing especially in British Columbia, where the climatic conditions were thought to be particularly suitable.

The Okanagan, Fraser River Valley and Vancouver Island have been the principal districts to respond to this appeal. About twenty growers in these districts grew small quantities each year. They have been encouraged to grow small quantities only, until such time as it would be known what kinds were suited to

particular districts and until some experience had been obtained in handling seed crops. The principal kinds of seeds grown thus far have been those which ordinarily are most used in the province, consisting of mangel, beet, sugar beet, turnip, parsnip, onion, carrot, cabbage, radish, tomato, cucumber, etc.

Care has been exercised in harvesting, selecting and storing roots for mother plants. During the very severe winter of 1915, however, in most parts of the province many roots which had been pitted in the ordinary way were frozen, and consequently, the acreage of field root and vegetable seed last year was not as great as was anticipated. The unusually wet spring also tended to reduce the yields.

One of the most noticeable features of seed growing in British Columbia is the high yields, particularly in the Fraser Valley and in well irrigated districts. In 1915, the averages were approximately as follows:

Mangel.	2,800	pounds per acre
Turnip.	900	" "
Sugar Beet.	3,500	" "
Beet.	1,800	" "
Onion.	300	" "

In most cases the yields are much higher than in Ontario. With mangels and sugar beet they are from two to three times as great. Yields from 1916 crops are not yet available.

As to the quality of British Columbia grown seed, it may be said that where the seed crops have been promptly and properly handled, the quality has been excellent. In a few cases on account of inexperience on the part of the growers, the seed was not first class, but in the majority of cases it was of splendid quality as to colour, plumpness and vitality. Last June the writer had opportunities of comparing several crops produced from home-grown seed with crops produced from ordinary imported seed of the same varieties. The comparisons in every case favoured home-grown seed. Growers themselves and their neighbours, whom they have supplied with seed, have clearly recognized the superiority of crops from home-grown seed. Consequently there is a growing demand among British Columbia farmers for seed grown in their own districts.

Good results have been obtained

with mangel and turnip seed in the Fraser Valley by planting the rootlings the previous fall. Mangel seed crops from fall planting, visited this year, were more advanced and vigorous than those from spring planting. Fall planting has the further advantage of smaller expense and loss through winter storing. Mangel rootlings planted in the fall of 1915 on Lulu Island came through a severe winter quite as well as most that had been pitted, but there were of course some blanks when the crop came up in the spring. It is questionable, however, if fall planting should be practised in any part of British Columbia except where the winters are mildest.

The success of field root and vegetable seed growing during the past two years would indicate that the province is eminently suited climatically and otherwise for the production of these seeds, and it now seems probable that a considerable proportion of Canadian vegetable seed requirements will in the near future be met by British Columbia grown seed.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

THE following is a list of the officers and employees of the Department of Agriculture who have enlisted between the 1st of November and the 1st of December, 1916.

INSIDE SERVICE

THE HEALTH OF ANIMALS BRANCH

Jas. C. Macfarlane, Ottawa.

THE DAIRY AND COLD STORAGE BRANCH

P. Connolly, Ottawa.

THE PUBLICATIONS BRANCH

N. H. Thompson, Ottawa.

OUTSIDE SERVICE

A. W. Busselle, V.S., Macleod, Alta.
J. M. Creelman, Grimsby, Ont.
A. Morley, Brandon, Man.

NOTE: In the list published in the December, 1916, issue of *THE GAZETTE*, the name of C. Wisdom, Agassiz, B.C., was printed "Wishom."

THE PUBLICATIONS BRANCH

PUBLICATIONS DISTRIBUTED IN 1916

DURING the year just closed the Publications Branch distributed more than two and one-half million copies of reports, bulletins, pamphlets and circulars issued by the various Branches of the Department of Agriculture. There were also mailed the twelve issues of The Bulletin of Foreign Agricultural Intelligence and of THE AGRICULTURAL GAZETTE OF CANADA. This distribution has reference only to publications issued and sent out during the year and does not include those published in previous years of which many were mailed in 1916 in response to requests.

The system of distribution employed was fully described in THE AGRICULTURAL GAZETTE for November, 1915. Following is a list of the reports, bulletins, pamphlets and leaflets distributed and the number of copies of each:—

REPORTS

<i>Title</i>	<i>Year</i>	<i>Number of Copies</i>
Agricultural Instruction Act		4,550
Dairy and Cold Storage Commissioner	1915	81,200
Experimental Farms		
" " Full	1915	113,920
" " Director	1915	59,000
Dominion Chemist	1915	53,000
" Field Husbandry	1915	59,500
" Animal Husbandry	1915	59,000
" Horticulturist	1915	59,600
" Cerealists	1915	58,800
" Botanist	1915	53,000
" Apiculturist	1915	53,500
" Agrostologist	1915	59,600
" Poultry Husbandman	1915	52,500
" Tobacco Husbandman	1915	10,000
" Entomologist	1916	25,450
Report of Minister	1916	700

BULLETINS

EXPERIMENTAL FARMS

<i>No.</i>	<i>Title</i>	<i>No. Copies</i>
86	The Apple in Canada, its cultivation and improvement	90,000
25 2nd Series	Tobacco Growing in Canada	20,700
26 2nd Series	Bees, and how to keep them	12,000
27 2nd Series	Soil Fertility, its economic maintenance and increase	2,500
28 2nd Series	Flax for Fibre, its cultivation and handling	2,000
29 2nd Series	The Cranberry industry, its possibilities in Canada	700
30 2nd Series	Feeding for Beef in Alberta. Results of Experiments at Dominion Experimental Stations in Alberta from 1909 to 1915.	100

ENTOMOLOGICAL BRANCH

12	The Cabbage Root maggot and its control in Canada, with notes on the imported onion maggot and the seed corn maggot	30,750
13	The Army cutworm.	3,000

DAIRY BRANCH

No.	Title	No. Copies
44	The Cold Storage of Food Products with some notes on insulation and warehouse management	700
45	The Testing of Milk, Cream and Dairy By-products by means of the Babcock test	88,100
46	The Testing of Milk, Cream and Dairy By-products by means of the Babcock test	1,000
	Determination of the Specific Gravity of Milk.	
	The Percentage of Acid and Casein in Milk.	
	Adulteration of Milk by Skimming and Watering.	
	The Percentage of Water and Salt in Butter.	
	The Percentage of Fat and Water in Cheese.	
47	The Grimsby Precooling and Experimental Fruit Storage Warehouse	8,000
48	Pre-cooling, Shipment and Cold Storage of Tender Fruit	8,000

HEALTH OF ANIMALS BRANCH

19	Enterio-Hepatitis or Black-Head and the Biological Laboratory System of raising turkeys	700
20	The Care, Sanitation and Feeding of Foxes in Captivity	650
21	Observations on the Migration of Warble Larvæ through the Tissues	230
22	A further Contribution on the Biology of Hypoderma Lineatum	420

SEED BRANCH

S-9 An Inquiry regarding the Wheat, Oats, Barley, Flax and Ensilage Corn used for seed in Canada	45,000
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CIRCULARS

EXPERIMENTAL FARMS

10	Late Blight and Rot of Potatoes (caused by the fungus <i>Phytophthora infestans</i> de Bary).	231,000
11	The Black Leg Disease of Potatoes caused by <i>Cacillus solanaprus</i>	183,000

DAIRY BRANCH

17 The Probable Scarcity of Rennet for the Manufacture of Cheese with some directions for securing a supply	28,000
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PAMPHLETS

FRUIT BRANCH

Fruit Crop Report (five numbers)	38,850
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LIVE STOCK BRANCH

19	Production and Marketing	114,000
20	Finish the Feeders at Home	50,080
21	The Bacon Hog and the British Market	114,000

EXPERIMENTAL FARMS

1	Seasonable Hints	277,000
2	“ “	277,000
3	“ “	277,000

PUBLICATIONS BRANCH

List of Publications	3,300
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TOTAL

Reports	803,320
Bulletins	314,550
Circulars and Pamphlets	1,593,230
	<hr/> 2,711,100

PART II

Provincial Departments of Agriculture

THE FEEDING OF DAIRY CATTLE

MACDONALD COLLEGE

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

IN compounding rations for our College herd we do not consider nutritive ratio as such. The matter of nutritive ratio and its control are incidental to other considerations. The two features which we base our ration allowance on are digestible protein, and what may be called the general substance and nutrition of the ration. Our practice is to decide upon the general character of the ration, due consideration being given to market price, availability, mixture, bulk, palatability, etc. Our next step is to standardize a ration within the above general selection as made in accordance with our judgment. In this attempt at standardization our object is merely to arrange, in terms of the feeds selected, a working guide in accordance with requirements which have been determined.

For the past four years we have employed the Scandinavian Feed Unit system of determined requirements. This system was adopted for the following reasons: Its calculation and employment are simple; it is the outcome of extensive test and based on actual practice; it affords a ready means of valuing and comparing feeds; we wanted to give it a trial.

It has given us splendid satisfaction throughout and I would not think of substituting any other

system for it except the one recently published as the Modified Wolf Lehman Standard. This new standard is arranged on much the same basis as the Scandinavian in that protein minimum and total digestible nutrients are its two features. It is more specific, more scientifically correct, and more easily adjusted with accuracy to our conditions. On the other hand it requires much more calculating and it must be remembered that no standard ration, be it ever so specific and accurate, can serve as anything but a general guide when employed even for the individual cow, and to a much greater degree is this true when applied to the herd as a whole. Herein is where the exacting standard becomes impracticable and may even be misleading because of its specific teaching.

Our cows are fed twice daily, each feeding including the full ration of silage, roots, hay and meal, the hay being given last each time. The evening's roots are fed before milking to simplify feeding at night from a labour standpoint. The cows are watered after each feed and have water before them at night in continuous troughs.

For ration allowance the herd is divided into groups based on weight and milk production. These groups are arranged to include the majority

of the herd and averages are taken within them. Three divisions are made on the basis of weight and three on the basis of milk, so that nine groups are arranged.

This year our ration consists of corn silage (well matured), mangels, mixed hay (clover and timothy), wheat bran, gluten feed, dried brew-

ers' grains, oatmeal feed (high grade), and nutted oil cake. The rations are made up and given the herdsman in the form of a guide sheet as below. It will be noted roots and oil cake are not included in the rations for low milkers.

The above meal ration is costing \$29 per ton.

DAIRY CATTLE RATIIONS

I. Wt. (1) 1,050 lb. & over Av. 1,100 lb.	Milk 35 lb. & over Av. 40 lb.	I. Wt. (2) Same wt. 25-35 lb. Av. 30 lb.	Milk 35 lb. 25-35 lb. Av. 30 lb.	I. Wt. (3) Same wt.	Milk Under 25 lb. Av. 15 lb.
Silage	35 lb.	Silage	35 lb.	Silage	42 lb.
Mangels	25 "	Mangels	25 "	Hay (mixed)	8 "
Hay (mixed)	10 "	Hay (mixed)	9 "	Meal mixture	5 "
Bran 3		Meal mixture	8 "		
D.B. Grains 3 meal					
Oat feed 2 mixture	10 "				
Gluten feed 2					
Oil Cake	1 1/2 "				
	meal	mixture, parts by weight			
II. Wt. (1) 900-1,050 lb. Av. 950 lb.	Milk 35 lb. & over Av. 40 lb.	II. Wt. (2) Same wt. 25-35 lb. Av. 30 lb.	Milk 35 lb. 25-35 lb. Av. 30 lb.	II. Wt. (3) Same wt.	Milk Under 25 lb. Av. 15 lb.
Silage	35 lb.	Silage	35 lb.	Silage	38 lb.
Mangels	20 "	Mangels	20 "	Hay (mixed)	7 "
Hay (mixed)	9 "	Hay (mixed)	8 "	Meal mixture	5 "
Meal mixture	10 "	Meal mixture	8 "		
Oil Cake	1 1/2 "				
III. Wt. (1) Under 900 lb. Av. 800 lb.	Milk 35 lb. & over Av. 40 lb.	III. Wt. (2) Same wt. 25-35 lb. Av. 30 lb.	Milk 35 lb. 25-35 lb. Av. 30 lb.	III. Wt. (3) Same wt.	Milk Under 25 lb. Av. 15 lb.
Silage	30 lb.	Silage	30 lb.	Silage	35 lb.
Mangels	20 "	Mangels	15 "	Hay (mixed)	7 "
Hay (mixed)	9 "	Hay (mixed)	8 "	Meal mixture	4 "
Meal mixture	10 "	Meal mixture	8 "		
Oil Cake	1 1/2 "				

Exception -- Heifers in full milk may require an allowance of oil cake when not giving enough milk to place them in the classes above which would entitle them to it.
-- Extra heavy milkers and extra heavy cows will have special allowance based on Group I. Division (1).

THE OKA AGRICULTURAL INSTITUTE

BY BR. M. ISIDORE, PROFESSOR OF ANIMAL BIOLOGY

OUR dairy cows are fed according to the quantity and the quality of milk which they produce and the feeds given are those which encourage the secretion of milk.

Our theory is as follows:—

It should be stated, in the first place, that by nutritive ration is meant the quantity of food which an

animal requires, whether for its maintenance, if it is not working, or for the production of some specified product: work, milk, flesh, etc. The maintenance ration, pure and simple, is indispensable, but it does not yield anything; the object of this maintenance ration is to keep the system of the animal in good condition and

to repair the wear and tear of organic tissues.

This maintenance ration is to be considered in the first place, but it should be completed by the production ration, which varies according to the quantity of milk produced by the animal and the butter-fat contents of this milk.

In order to give a maximum yield of milk, a cow should receive a sufficient quantity of feed and of such quality that her milk organs may work at their full capacity. If the quantity of feed is not sufficient, the production of milk may remain fairly high for a few months after calving, but after this the cow will take out of her tissues the materials that are necessary for the making of milk and naturally she will get thin and the production of milk will then considerably decrease.

The materials required by the mammary glands are contained in the feed. However, the nutritive elements of the feed do not pass directly into the cow's udder and into the milk; they are at first digested, transformed, then absorbed into the blood which distributes to each organ the elements that this organ requires to accomplish the special duties for which it is intended.

The function of the mammary glands is to secrete a liquid of a special composition, viz., milk.

Milk is therefore a product of the secretion of mammary glands. Its most important elements are elaborated in the udder, viz., butter-fat, casein and sugar or lactose.

Physiologists claim that milk sugar is not found in the blood but only in the milk. This shows conclusively that milk sugar is a product of the secretion of the udder, elaborated from the glucose of the blood.

It is the same with butter which is produced in the cells of the udder. It is generally admitted that the protein and the carbohydrates contained in the feed concur in the production of butter as well as the fats

of the feed. Furthermore, the fat which is found in the feed is not the one which makes the butter-fat in the milk. This is shown by the fact that an excess of fat in the feed does not influence the quantity of butter-fat in the milk. On the other hand, a ration rich in protein gives a milk containing a high percentage of butter.

Casein, like milk sugar, is not found in the blood or in the tissues. It is also a product of the secretion of the udder, caused by the destruction of the protoplasmic tissue of this organ.

These considerations lead us to this conclusion that a milking cow should receive a ration rich in protein and carbohydrates and that this ration should contain a sufficient quantity of fat and mineral matter.

The rational application of this principle is found in the American method of feeding, recommended by Armsby, and suggesting, for a cow weighing 1,000 lb. a maintenance ration containing 0.50 lb. of protein, pure and digestible, and six thermic units; also for each pound of milk of average composition given by a milking cow a production ration containing 0.05 lb. of protein and 0.3 thermic unit.

Therefore, a cow giving 40 lb. of milk per day should receive as follows:—

	Protein	Thermic Units
Maintenance ration....	.50	6.0
Production ration.....	2.00	12.0
<hr/>		
Total nutritive ration	2.50	18.0

On the other hand, Eckles recommends to increase the proportion of digestible protein and of thermic units when the milk contains a larger quantity of butter-fat. As protein and carbohydrates concur in the formation of butter-fat, the quantity of these two elements should be increased in the ration, as the percentage of butter-fat increases in the milk. Naturally, a rich milk requires

more nutritive elements for its production than a poor milk.

These few considerations show conclusively that the proper base in feeding is the production of milk.

This winter, the ration given to our milch cows is composed of clover, corn ensilage, wheat bran, oat flour, barley and molasses flour.

The ration is given in two meals, but there are several distributions at each meal; the cows have therefore more time to rest, to chew their cud, and they are quite as thrifty as if they received three meals.

Milk contains a large proportion of water; it is important, therefore, that dairy cows consume a great

quantity of water. The most practical way to water the cows is to keep before them, at all times, fresh and pure water, so that they may drink as much as they like. With this system, water is always at the right temperature and never causes digestive troubles. Animals never absorb large quantities of water at one time.

The nutritive ration for the cows in full milk should include the following feeds:—

- 15 lb. of red clover.
- 30 lb. of corn ensilage.
- 4 lb. of wheat bran.
- 3 lb. of oat flour.
- 2 lb. of barley flour.
- 2 lb. of molasses flour.

THE ONTARIO AGRICULTURAL COLLEGE

BY A. LEITCH, B.S.A., FARM MANAGER AND LIVE STOCK INVESTIGATOR

IN compounding rations for cows giving milk, we do not follow any set nutritive ratio. This will vary from 1:4 to 1:6. Those cows which are on Record of Performance test and giving a large amount of milk are fed the ration with the narrow nutritive ratio, the cows well advanced in lactation being fed the ration with the wider nutritive ratio.

The character of the concentrates which we feed is, of course, largely determined by the market price of the feeds which are generally used for milk production. However, we aim under present conditions to have bran and dried brewers' grains form at least $\frac{3}{4}$ of the concentrate ration of all our cows. The balance is made up of oil cake or cotton seed meal, or both of these feeds. The amount of concentrates fed to each cow depends, of course, on the amount of milk which she is giving. In general, I would say that to our Holstein cows we feed about one pound of meal to each five pounds of milk produced. To our Ayrshires and Jerseys, we feed about

one pound grain mixture to each four pounds of milk being produced.

During the winter the hours and method of feeding are as follows: 7 A. M. silage, with half the grain ration for the day; 9 A. M. water (the feeding manger being also used as a watering trough) 9.30 A. M. the entire hay ration for the day; 3.30 P. M. water; 5 P. M. entire root ration for the day; 5.30 P. M. silage and balance of grain ration.

During this present winter, owing to the scarcity of roots, and the abundance of hay, it is our intention to feed hay in the evening in place of mangels, with the expectation of feeding each cow, at least, 50 per cent more hay this year than last year.

At the present time our grain ration is made up of 200 lb. of bran, 200 lb. dried brewers' grains, 100 lb. oil meal. We are feeding now from 25 to 50 lb. silage per cow, and 8 to 10 lb. clover hay. Very soon, however, we shall be decreasing the amount of silage and adding considerably to the amount of hay fed.

ALBERTA

BY J. McCAIG, EDITOR OF PUBLICATIONS

OWING to the large supplies of natural fodder in the province and the capacity of the province for producing cheaply large quantities of coarse grains, one of the important conditions for the success of the dairy industry is satisfied. On the other hand, while the grasses are highly nutritious in a general way they are not as succulent as they are in the parts of the Dominion with heavier precipitation and so are not conducive to the heaviest milk flow. From the standpoint of actual content the grasses are high in carbohydrate and low in protein content. The growing of clover is not common in the province, and, generally, the production of leguminous crops is not too easy. Where alfalfa succeeds best other fodders are not luxuriant and the conditions generally are not favourable to the dairy industry. Where the dairy industry is best established, i.e. in Central Alberta, there is a need for furnishing the larger part of the protein of the ration in the form of concentrates, such as bran, oil-cake, etc. As these are fairly high in price and the bulky and carbonaceous foods, on the other hand, are very cheaply grown, it naturally leads to the feeding of a wider ration than might otherwise be used. The nutritive ratio on the provincial farms where

alfalfa is not grown will be about one to eight.

In the use of concentrates, the rule of applying one pound for every three pounds of milk produced is followed, this being supplied twice a day, morning and evening. In some of the stables water is available constantly from individual bowls in front of the cattle. In other cases, they are watered twice a day. The rations being fed to dairy herds in the winter months are made up of roots and ensilage; green feed, tame and prairie hay; oat chop, barley chop, bran and oil-cake. The ensilage consists of corn, green oats, green oats and peas, alfalfa, or any convenient combination of these, according to the adaptability of the soil and climate where the farms are situated. Corn is successful at Medicine Hat, Claresholm, Sedgewick and Vermilion, but green oats and mixtures of green oats with other crops have made entirely satisfactory ensilage at some of the other farms, particularly at Olds. With regard to concentrates, oat chop makes about half the ration. Barley and bran are used in equal quantities by weight, oil-cake to the amount of a couple of pounds, or ground flax seed to half this amount being added to each feed.

We owe the farmers nothing which we do not owe ourselves and which we do not owe to our state and to our nation. We have one great obligation resting upon us and this is to work for greater prosperity along every line in order that civilization may be lifted or pushed forward one more step.—*John Lee Coulter, Dean, West Virginia College of Agriculture.*

THE CONTROL OF GOPHERS

MANITOBA

BY V. W. JACKSON, PROFESSOR OF BOTANY, MANITOBA AGRICULTURAL COLLEGE, AND J. H. KITELEY, FIELD REPRESENTATIVE

WHILE the loss occasioned by the ground squirrel, or gopher, as it is called, is not as great in Manitoba as in the other western provinces, it is much greater than usually estimated and is quite a needless loss of several million dollars to the province every year. On a careful survey of the province last spring it was estimated

that there were at least nine million gophers in twenty-five townships, causing a loss of at least \$2,250,000, or averaging \$100,000 per township. By placing a low estimate of twenty-five cents as the cost of boarding a gopher in the grain field, this careful estimate is made on the following statistics:—

TOWNSHIP	Gophers per Acre	Gophers	Loss
Shell River, North Cypress, and Pembina	30	2,000,000	\$500,000
Shellmouth; Whitewater and Whitehead	25	1,600,000	400,000
6 Townships	20	2,600,000	650,000
5 "	15	1,600,000	400,000
3 "	10	600,000	150,000
5 "	5	600,000	150,000
Average	20	9,000,000	\$2,250,000

These reliable figures show that in many townships the loss due to gophers exceeds the cost of seed grain, or \$2.50 per acre, and in many townships double this loss. In view of the fact that the cost of treating infested land with a reliable gopher poison is less than three cents per acre, and which, if systematically applied at the right season, gets the gopher, it is apparent that this enormous loss could be avoided.

WHAT IS BEING DONE

The Biology Department of the Manitoba Agricultural College took up the gopher problem last spring. Posters, calling attention to the loss due to gophers, and the various ways to get the gopher, were prepared and distributed throughout the pro-

vince. A field man, Mr. J. H. Kiteley, was sent into the worst districts and was assisted in other parts of the province by the District Representatives. Owing to the scarcity of strychnine, and its prohibitive price (over \$2 per ounce), well known prepared gopher poisons were recommended, and one firm volunteered to give free samples. Over 400 free packages were thus distributed and over 1,500 larger packages, treating 80 or 160 acres each, were sold at prices usually given to municipalities; and if local druggists and others throughout the province have sold three times as much, it only means 6,000 packages, or an expenditure of about \$3,000 to prevent a \$3,000,000 loss. And the largest gopher poison manufacturers, who do an

annual business of \$100,000 in the three western provinces, state that their Manitoba business was only \$426, such a small amount that they scarcely consider this province a market for gopher poison, and hence their willingness to give away samples, and supply at wholesale prices, in order to introduce the gopher poison in Manitoba. It is, therefore, evident that we are not making an adequate effort to control the gopher. The lateness of the spring prevented the farmer from treating his land early, and the wetness of the season made such a green growth that the gopher was more difficult to get than usual; but from every trial we got satisfactory results, and reports have been received from all over the province showing the effectiveness of gopher poison. An interest has been aroused which should be continued and followed up.

The Biology Department have answered over 400 enquiries by mail, and have sent out circular letters at regular intervals to the local druggists, municipalities and District Representatives. Our experience and success this year warrant recommendations in dealing with the gopher problem which we beg to submit.

First, that a provincial Gopher Act, similar to the Noxious Weeds Act, be passed, making the treatment of gopher-infested land compulsory, and permitting municipalities to treat vacant lands, and charge to the absentee owners. The greatest barrier to individual effort seems to be the vacant land. Scores of farmers give this as a reason for not treating their land. The councils of Shell River, Shellmouth and Hillsburg were interviewed while in session, and expressed themselves as strongly in favour of a provincial Gopher Act. A large number of reeves and members of councils were also interviewed, and they considered a compulsory Act as the only solution of the problem. The reeve of Winchester mu-

nicipality reported that his crop was being destroyed by gophers from a neighbour's vacant land. Gophers can move about more readily than weeds, and, at all seasons, make the vacant land a greater menace from gophers than from weeds. Others say that it is useless to put out gopher poison when neighbours neglect to control their gophers, and when vacant lands serve as breeding grounds. Uniformity and co-operation are necessary to get the gopher, and there seems a general desire for a provincial Act to insure control, and save this loss of several million dollars.

Second, we believe that the Municipal Weed Inspectors are the proper agents to enforce and carry out such a Gopher Act. This would not interfere with their regular duties, but simply extend their working season, which they complain is too short to be profitable. Their duties begin on May 15th, before which time the gopher land should be treated. The weed inspectors in some twenty-five townships could, therefore, be gopher inspectors for six weeks, April 1st to May 15th, which is the only season during which the gopher can be controlled. At a weed inspectors' conference at the college last June, Mr. Harry Brown and Commissioner Bedford thought that this would be an excellent way of extending the working period of the weed inspector. Being a municipal agent, he could act in unison with the municipal council in dealing with vacant lands.

Third, we found that the giving out of free poison by municipalities (and many do it) without a Gopher Act to enforce the application of the poison, is a waste of money to the municipality. Several years' free poison was found on the shelves of many homes. A Gopher Act will eliminate this difficulty, and provide a more business-like and a surer way of controlling the gopher.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

THE loss to Saskatchewan farmers by the depredations of gophers reaches an alarming figure each year. Thousands of dollars are expended annually by municipalities and private individuals upon preparations for poisoning the gophers. Where these are wisely used, early in the season, much good accrues, the gophers being reduced to such numbers that their presence does not seriously affect the growing crops. On the other hand, lack of organized effort and the wasteful distribution of poisoned grain late in the season are only too apparent in a great many cases, and the results obtained are negligible and out of all proportion to the moneys expended for the purpose in view.

The Rural Municipality Act gives the council of each municipality the power to pass a by-law to provide ways and means for the extermination of gophers, which might include the granting of a bonus to be fixed by council for each gopher tail presented for inspection to some person authorized to pay the bounties.

Section (193A) of the said Act further provides that,

"In case proper steps have not been taken by the owner of any land to exterminate gophers on such land pursuant to any by-law passed in that behalf on or before a day to be fixed in the bylaw any person or persons duly authorized thereunto by the council may enter upon the said land, and may take such steps as may be necessary to exterminate the gophers thereon.

("2) The amount expended in the work performed under subsection (1) hereof may be recovered from the owner or occupant of the land by action in the name of the reeve or by distress by the reeve or his agent of any chattels on the land; provided that the amount so expended shall not exceed two and one-half cents per acre.

"(3) Any such amount which has not been satisfied on or before the thirty-first day of December next following its

expenditure shall be added to and form part of the assessment for municipal purposes of such lands in all respects as if it were an original tax: and it shall have the same effect on the land and may be recovered in any of the modes available for the recovery of such taxes and the amount so recovered shall form part of the general revenue of the municipality."

Provision is also made for the destruction of gophers on untaxable land at the expense of the municipality.

It is thus seen that ample machinery is provided for combating this pest, and with the view to setting the machinery in motion, the department embarked upon a publicity campaign last spring and addressed Circular No. (1), "Gophers", to the provincial press, the agricultural press, secretary-treasurers of municipalities, villages, towns and cities, and also to the secretary-treasurers of Grain Growers' associations and members of the Legislative Assembly.

Circular No. 2 advocating the general adoption of a "Gopher Day", was issued as a "follow up", later in the season when the gophers were beginning to make their appearance.

Circular No. 3 pointing out that "gophers", in 1915, cost Saskatchewan \$4,000,000, and urging a general campaign of destruction, was forwarded for display upon the bulletin boards that occupy a prominent place in all the banks throughout the province.

We have not yet taken steps to ascertain the results of the year's activities along this line, but perusal of the following extracts from communications received by the Department will show that several municipalities are fully alive to the importance of keeping the gophers in check:

Mr. C. H. Vail, Secretary-Treasurer of Rural Municipality of Fillmore No. 96, writes:

"I have printed circular and am pleased with knowing of the interest your Department is taking in the matter, as our municipality has been losing thousands of dollars every year by this pest.

"This year our municipality purchased one thousand ounces of strychnine sulphate at wholesale price for cash, at \$1 per ounce, and are supplying the farmers at this price. Since our purchase I understand prices have advanced fully 50 per cent.

"Your idea of having a 'Gopher day' is surely a good one.

"One of our troubles with the pests is the Canadian Pacific Railway right-of-way. On account of the grain that is spilled along their tracks the gophers are there in large numbers and as soon as there is green stuff for them to eat they are in the farmers' grain. If you could induce the railway companies to give them more and better attention it would be a great help."

In accordance with Mr. Vail's suggestion we took up the matter of poisoning gophers on the railway right-of-way, with the railway companies and were informed by Mr. Thos. H. Young, Chemist for the Canadian Pacific Railway company, that the company was very much interested in the gopher problem and had shipped a large quantity of poisoned grain for the destruction of gophers along the railway tracks.

The following is an extract from a letter received from Mr. E. M. Axness, Secretary-Treasurer of Rural Municipality of Fertile Valley No. 285:

"We are in receipt of the circular recently issued by the Department of Agriculture and may say that the council of this municipality is making strenuous efforts to inaugurate a successful campaign against these rodents.

"At the last meeting of the council it was resolved as follows, viz:—

"That this council institute a Gopher Day in this Municipality and that posters and handbills be printed and freely distributed urging the necessity of co-operation in a united and concerted effort to gain control of this pest and that the ratepayers in each district notify their respective councillors of the number of vacant quarters in their vicinity with the view to obtaining poison to be put out on such vacant lands.

"Early next week we are sending to every resident rate-payer in the municipality the

annual statement and if you could let us have about 1,000 copies of the circular received from you and any other information on this matter we would be glad to send them out with the statements."

From Mr. John F. Burns, Secretary-Treasurer of the Rural Municipality of Paradise Hill, No. 501, the appended interesting letter was received:

"Your circular re extermination of 'gophers' to hand and noted.

"Evidently the same thought as you express has been in the minds of others as witness the following:—

'Council meeting of 20th March, 1916.

'Motion:—Reeve, that whereas it is most desirable that concerted action and effort be made, this Council make order that all parties be required to put out poison and take such other efficient steps for the extermination of gophers, between the 20th April and 10th May. Agreed and order issued accordingly.'

"I would suggest that you send us a liberal supply of the circular that we may distribute to supplement our local order, and would also suggest that more study and research be given the question than has been in the past. Expenditures have been altogether out of proportion to results and we are at the stage where more thought has to be given."

Nearly every municipality takes action of some kind to control the gophers and the practise most in vogue appears to be the purchasing of a supply of poison to be used for the extermination of gophers in accordance with instructions furnished at the time the poison is distributed to the rate-payers. In some municipalities the bounty system has been tried out at considerable cost, one municipality paying out over \$3,000 in bounties during 1915.

This year the Remington Arms Company in conjunction with the hardware dealers conducted a gopher competition in Saskatchewan. Mr. Colon Le Page won the local prize under the auspices of Mr. George McIntosh, hardware merchant, of Vonda, and also the Grand Western Championship. He accounted for no less than 2,879 gophers. His

nearest rival being an Alberta competitor, who killed 2,087 of these troublesome rodents. It is calculated that over 300,000 gophers were killed in this contest, and it is safe to say, that if these were allowed to live their progeny would have reached the million mark by this time.

Generally speaking, praiseworthy efforts have been made to combat this pest by the majority of farmers, but here and there we find that through lack of knowledge in hand-

ling the poisoned grain at the proper season, or through wilful neglect to carry out the instructions that accompany the commercial poisons, the results obtained were altogether too small in comparison with the expenditure made and the labour involved. Above all other things co-operation is essential to a successful campaign against the gophers and there should be little difficulty in holding this destructive pest in check, if the knowledge already available is intelligently applied.

ALBERTA

BY J. MCCAIG, EDITOR OF PUBLICATIONS

THERE is no specific legislation in this province setting out methods or powers with regard to gopher extinction. All that is being done is being done by individual farmers and gardeners and the trouble is being more or less successfully met. A few districts on their own account give encouragement to children by giving premiums for the destruction of gophers but the remedy that is used with most effect is poison. In answer to inquiries as to the best remedy to employ, the Department commonly furnishes the following recipe as the one which appears to be used with best results:

(1) Mix thoroughly one ounce strychnine alkaloid (powdered) and one ounce baking soda.

(2) Sift this into $\frac{3}{4}$ pint of thin, hot starch paste and stir to a creamy mass. The starch paste is made by dissolving one heaping tablespoonful of dry gloss starch in

a little cold water, which is then added to $\frac{3}{4}$ pint of boiling water. Boil and stir constantly until a clear thin paste is formed.

(3) Add $\frac{1}{2}$ pint of heavy corn syrup and a tablespoonful of glycerine and stir thoroughly.

(4) Add $\frac{1}{8}$ ounce saccharine and stir thoroughly.

(5) Pour this poison solution over twenty quarts of clean oats and mix thoroughly so that each grain of oats is coated. Prepare it twenty-four to forty-eight hours before using.

For mixing small quantities an ordinary galvanized wash-tub is convenient; for larger quantities a tight smooth box may be used, and mixing may be done with a spade.

(6) A teaspoonful of the poisoned oats should be placed near each ground squirrel hole on clean hard ground, letting it scatter slightly as it falls. (Placed in this way it will not endanger stock). Do not put the poisoned grain on the loose dirt of the mound or into the holes. Each quart of the poisoned grain is sufficient to treat about sixty holes.

BRITISH COLUMBIA

BY WM. J. BONAVIA, SECRETARY, DEPARTMENT OF AGRICULTURE

At each farmers' institute convention for several years past the attention of the Department has been drawn to the increasing menace of gophers and ground squirrels, the depredations of which are resulting in considerable loss to farm and garden crops in this province.

From information gathered it would appear that the south-eastern section of the province is the most affected, including the following valleys:—Arrow Lakes, Kootenay Lake, Columbia Valley, and the northern end of the Okanagan. Whilst partial to grains in all stages of growth, gophers in the valleys mentioned appear to develop a liking for young fruit trees, both roots and bark suffering.

A good many years ago, the Government gave a bounty on gopher heads in certain districts, but this was discontinued for various reasons, although the matter of a bounty has again been put forward as a means of restricting the pest. Certain farmers' institutes have themselves offered a bounty of five cents per head, but the finances of these bodies would not permit of any extension along this line. The Department has up to the present season steadily turned down any resolutions put up at the annual convention dealing with an extension of the bounty system, feeling that the matter was one which should be dealt with more by local associations and by other methods.

However, following a unanimous resolution passed at the farmers' institute central convention, held in March, 1916, respecting assistance from the Government to combat the gopher pest, which was stated to be increasing in the province, the Department got in touch with the Fort Dodge Chemical Co. of Fort Dodge, Iowa, and the National Drug and

Chemical Co. of Canada, Ltd., with regard to a supply of poison.

Some delay occurred before all arrangements were made and this operated to a certain extent against the full value of the experiment, as it was not until early in May that consignments of the two poisons were despatched to twelve selected institutes, in whose districts the gopher pest was considered to be the most serious.

The Fort Dodge Chemical Co. supplied what is known as 'Gopher Death', being a preparation of strychnine put up in the form of tablets, it being stated that the best results are obtained by using these tablets when the ground is dry. The National Drug and Chemical Co. of Canada, Ltd., supplied a preparation called "Gophercide", this being a soluble form of strychnine in which wheat is soaked for several hours and then placed near the warrens.

The various institutes supplied with this poison report as follows:

CRAWFORD BAY

The farmers to whom the poison was distributed favour the tablets. No destruction to game birds reported in this district from the use of the poison.

NEEDLES

Instructions for the use of the poisons were carefully followed, the only complaint being from one rancher that the small tablets on being placed in the moist earth in the holes seemed to fall apart or disintegrate. No game hurt by use of poisons.

GOLDEN

The poison was properly distributed at the gopher warrens and whilst checking the pest considerably

has not extinguished the gophers. No harm to game birds.

GRAND FORKS

"Gophercide" was used early in the spring, when the gophers first appeared, with good results. Later in the season, when the vegetation was more advanced, the gophers did not eat the poison so readily.

CRESTON

This institute reports that "Gopher Death" tablets were preferred generally by members as being more effective and easier to handle.

JAFFRAY

Results of both poisons supplied were satisfactory, but earlier distribution is asked for if the campaign is to be carried on in succeeding years.

HARROP AND DISTRICT

"Gopher Death" tablets preferred on account of efficacy and convenience in handling.

REVELSTOKE

A very satisfactory result was reported from most of the members using the tablets. It was felt by all that if placed out a little earlier in the season, it would still be better. They all desired to know what was to be done next year, as the poison should be ready on time in a greatly increased quantity. The "Gophercide" was not liked by anyone, it was very much more trouble to prepare the grain, and those who did try it said that they did not see much good resulting. Men who tried both kinds on different parts of their farm said that the tablets practically cleaned out all the gophers, while the "Gophercide" did not seem to diminish them in any way whatever. The same trouble though, arose as in previous years—the farmers were successful in reducing the pest on their own

properties, in most cases destroying the females before delivering their young, but later in the season their lands were again swarmed over by the gophers from Government roads and vacant lands. No game birds were damaged or destroyed in this district.

METHODS OF CONTROL

The consensus of opinion gathered from reports sent in to the Department point to the strychnine tablets supplied by the American company mentioned above as being the most efficacious. There is always an element of danger in having strychnine in the form of a powder or solution about farm premises, and, as repeatedly noted, the handy form of the tablet is much preferred by the farmers, who can place same in the warrens when going over their land.

Some individuals have used currants soaked in strychnine solution with splendid results, whilst one Prairie farmer vouches for the use of a small piece of cotton waste or wool soaked in gasoline and placed in the mouth of the warren, which is then closed up. These processes, however, would not be practicable on a large scale and the use of crude carbon bisulphide is less expensive than the pure form as recommended. This costs about \$3 a gallon, and the crude carbon bisulphide is really more effective. This chemical volatilizes very readily, forming a poisonous gas heavier than air, which will sink to the bottom of the burrows. (The gas will explode in the presence of a lighted match).

For a small burrow with one or two holes, pour two tablespoonfuls of carbon bisulphide on some cotton, old rag, or dried horse manure, and drop it down the burrow. Close the exit securely with packed earth or sod. The gas inside will smother the gophers humanely.

In the case of large burrows, every other hole should be so treated and every hole stopped up. This

method, to be used economically, must be used not later than May, because after that the gophers scatter in search of better feeding grounds. The earlier in the season this method is tried, the better. The following poison formula is recommended by the United States Department of Agriculture:

Barley	20 quarts
Strychnine sulphate (powdered)	1 ounce
Saccharine	1 teaspoonful
Laundry starch	$\frac{1}{2}$ teacup
Water	$1\frac{1}{2}$ pints

Dissolve the starch in a little cold water and add $1\frac{1}{2}$ pints of boiling water, making a rather thick solution. While hot, stir in the strychnine and mix until free from lumps; then add the saccharine and beat thoroughly. Now pour the poisoned starch over the barley and stir

rapidly until the starch is evenly distributed; then allow the grain to dry. When dry it will keep indefinitely. Place a large tablespoonful just within the burrow so that birds and fowls will not get poisoned.

Later in the summer gophers may be trapped in their runways. The captured ones make very good poultry food when insects begin to get scarce. Most kinds of hawks and owls also help a great deal to keep gophers in check.

In conclusion, emphasis is placed upon early action in the spring. By killing the old females before the young ones appear, four or five young gophers are accounted for with every female. After hibernation, as soon as the gophers appear above ground, and for the following two months, every possible means should be employed to kill them.

War has drawn our attention to the strength derived by an enemy from a developed agriculture. Germany to-day is realising, as Britain realized in the past, the benefits that come to the nation which fosters this industry. In Germany to-day, and not in Germany alone, but in those other countries which have recently made progress in agriculture, chief attention has been given to the problem of improving the cultivator as a preliminary to improving the land. The general conditions in these countries have varied; and, looking back in our own agricultural history, we find in it conditions which differed widely from those of Northern Europe and the United States of America in the beginning of the twentieth century; but throughout a long period and within these many countries one condition has not varied. Preceding each forward move in agriculture, governments, or societies, or educational institutions "have applied themselves to the study of this most useful art." and have discovered that the first essential for the improvement of agriculture is the improvement of the farmer himself.—*Journal of the British Board of Agriculture.*

ONTARIO

ADMINISTRATION OF THE DEPARTMENT OF AGRICULTURE

FOLLOWING the recent death of the Honourable James S. Duff, Minister of Agriculture for Ontario, important changes have been made with reference to the administration of that Department. The Honourable W. H. Hearst, Prime Minister, has taken

intends to give special attention to the problem of providing suitable opportunities to all returned soldiers who wish to take up farming, as well as doing everything possible to stimulate production during the period of the war.

The career of the new Minister of Agriculture is well known in his native province at least. He was born on a farm in Bruce county, where he spent his boyhood days. Without any special advantages except those which are the common lot of almost every boy in this country, he has, through ability and character, risen to the highest position in the gift of the people of the province. After a successful career as barrister in Sault Ste. Marie, he was elected in 1908 to represent that



HON. W. H. HEARST
Prime Minister and Minister of Agriculture.

the Portfolio of Agriculture and will act as Minister of Agriculture in addition to his duties as Prime Minister. In so doing it is felt that he has paid a distinct compliment to the Department, and to the industry which it represents. Although it is intimated that this arrangement is not necessarily permanent, it is felt that it will bring the Prime Minister in close touch with the farming community and no doubt much good will result therefrom. He has already intimated that he



DR. G. C. CREELMAN, B.S.A., LL.D.
Commissioner of Agriculture and President of the
Ontario Agricultural College.

constituency in the Legislature. In 1911, following the transition of Honourable Frank Cochrane to Ottawa, he was selected by Sir James Whitney to take over the Portfolio of Lands, Forests and Mines. In 1914, following the death of Sir James Whitney, he was invited by the Lieutenant-Governor to form a Government, and has held the position of Prime Minister since that time. He brings to the Portfolio of Agriculture not only a broad and genuine sympathy with agricultural interests, but also the prestige of high distinction.

Simultaneous with the swearing in of the new Minister it is announced that Dr. G. C. Creelman, President of the Ontario Agricultural College, has been appointed as Commissioner

of Agriculture for the Province. This is a new position. While continuing to act as President of the Ontario Agricultural College, where he has won for himself such high regard throughout the agricultural community, Dr. Creelman will act as chief adviser to the Minister and will assist the Minister on matters of agricultural policy, especially in working out the policy of placing soldiers on the land and increasing production. Dr. Creelman's duties at first a least, will be more advisory than administrative, but no doubt changes will develop as the work progresses. The selection of Dr. Creelman to this important work has been received with many expressions of approval from all parts of the province.

MANITOBA

SEED EXCHANGE

IN order to assist in bringing together those who desire to secure seed grain and those who have good seed grain to dispose of, the Department of Field Husbandry has organized a Seed Exchange Bureau. Samples of good grain will be accepted from any farmer in Manitoba for this purpose. Germination and purity tests will be made and filed for reference, after reporting same to the sender of the sample. Upon receipt of an enquiry for seed grain, the Department

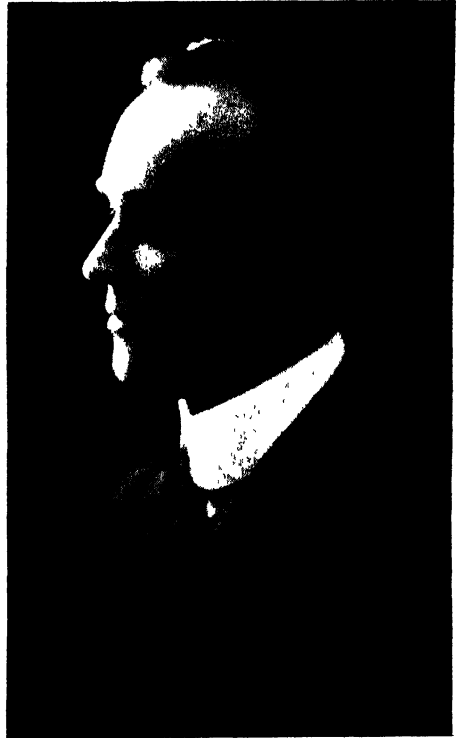
will place the enquirer in touch with farmers able to supply his needs.

Samples sent in for this purpose should consist of at least a pound of grain cleaned in such a manner as to be representative of the material that will be shipped out to purchasers, and the package should be marked "Seed Exchange". A sample of this size should be sent by parcel post. Persons who submit samples are required to state in a letter the amount they have available for sale and the price of same.

SASKATCHEWAN

THE NEW DEPUTY MINISTER OF AGRICULTURE

MR. F. H. Auld, who has succeeded the late Major A. F. Mantle as Deputy Minister of Agriculture for Saskatchewan, was born in Prince Edward Island and went to Saskatchewan in 1902, after graduating from the Prince of Wales College at Charlottetown. He became a member of the staff of the Department of Agriculture at Regina in 1902 and five years later organized the Statistics Branch of the Department. In 1909, he became Superintendent of Fairs and Institutes, Secretary of Saskatchewan Live Stock associations and Manager of Saskatchewan Winter Fair. He was also a director of Agricultural Extension in the College of Agriculture. He had charge of the moratorium work for the Saskatchewan Government during the drought year, 1914, and was chairman of the Stallion Licensing Board in 1915. He is vice-president of the Western Canada Live Stock Union and, prior to Major Mantle being killed in action, was acting Deputy Minister of Agriculture.



F. H. AULD
Deputy Minister of Agriculture

ENFORCEMENT OF THE NOXIOUS WEEDS ACT

AN amendment to the Noxious Weeds Act passed at the last session of the legislature makes it now obligatory upon all municipalities, both rural and urban, to appoint one or more inspectors to enforce the provisions of the Act, and further providing that such inspectors shall hold office until their successors are appointed. In 1915, there were 603 inspectors appointed, but many of these held office only for a few weeks during the months of

June and July. In 1916, as a result of the amendment above mentioned, 1,303 inspectors were appointed and these inspectors are responsible at all times for the proper enforcement of the Noxious Weeds Act.

To superintend and guide the work of these inspectors the Weeds and Seed Branch of the Department of Agriculture appointed six Field Representatives. The province was divided into six districts, one being assigned to each Representative,

and during the past season the Field Representatives travelled throughout their allotted territory, visited the Municipal Inspectors, met municipal councils and advised them in regard to matters pertaining to weed control.

From reports received by the Weeds and Seed Branch, it is evident that as a result of the increased number of Inspectors and the direct supervision of the Field Representatives a great improvement has been effected in weed control work throughout the province. The unprecedented rainfall of the past

summer has undoubtedly rendered weed control difficult, but the Department is confident that as a result of the more rigorous enforcement of the Noxious Weeds Act, and the educational work carried on by the Field Representatives, a greater interest has been awakened among the farmers in regard to this important matter and that in the near future, everyone at work on the land will realize the necessity both from a personal and community standpoint, of taking active and adequate measures to keep his land free from weeds.

BRITISH COLUMBIA

PROFESSOR J. A. McLEAN

MR. J. A. McLean, who has just entered upon his duties as Professor of Animal Husbandry in the University of British Columbia, was born at Ormond, Dundas County, Ontario. He is an honour graduate of McMaster University, Toronto, in Natural Science and obtained his B.Sc. in Agriculture from Ames in

1905. Since graduating, Professor McLean has done teaching and experimental work in Animal Husbandry in the State Colleges of Agriculture in Colorado, Iowa and Massachusetts. His natural aptitude, thorough training and wide experience admirably qualify him for the important position to which he has just been appointed.

NURSERY STOCK IMPORTATIONS

BY R. C. TREHERNE, DOMINION SUPERINTENDENT OF FUMIGATION AND
W. H. LYNE, PROVINCIAL INSPECTOR OF IMPORTED NURSERY STOCK

ALL nursery stock, including standard fruit trees and bushes; nut trees, grapes, ornamental trees and shrubs, fruit tree and ornamental seedlings and grafts, imported into the province of British Columbia from Europe, United States, Japan and all outside points, are subjected to inspection or fumigation or both, under the provisions of the Dominion Destructive Insect and Pest Act and Provincial Horticultural Regulations. Such nursery stock destined for planting in any part of the province must be consigned through Vancouver, and can

be imported only through this port between October 1st and May 1st. Canadian shipments, while exempt under the Dominion regulations are subject to inspection and fumigation under the Provincial enactment. The following figures show the number of individual trees, bushes, etc., received at Vancouver during the years mentioned. Shipments from other parts of Canada, being small in proportion to the total importations from other parts of the world, are included in these figures. The quantity of stock condemned as unfit to be allowed entrance into the

province is not deducted from these figures, hence, while the table shows the volume of business carried on for the province, it is not a true representation of the numbers of trees or bushes planted in the province.

In the table, standard fruit trees include, apple, crab-apple, plum, pear, cherry, prune, peach, quince, apricot, nectarine and mulberry; nut

trees include figs, walnuts, filberts, chestnuts and almonds; small fruit bushes include grapes, currants, gooseberries, raspberries, and blackberries; ornamentals include roses and trees and shrubs imported for planting for shade and ornamental purposes; seedlings include grafts and tree seedlings used as stock for home propagation of standard fruit trees and ornamentals:

Fumigation Season	Nature and Amount of Stock				
	Standard Fruit Trees	Nut Trees	Small Fruit Bushes	Ornamental	Seedlings
October—May					
1905—1906	225,980	2,040	141,730	28,984	565,405
1906—1907	361,800	3,549	105,205	59,085	909,317
1907—1908	364,101	2,985	120,562	135,132	801,102
1908—1909	319,674	6,187	137,411	186,066	814,708
1909—1910	350,236	3,198	149,514	203,141	2,105,675
1910—1911	321,517	2,384	107,494	288,158	3,257,154
1911—1912	396,298	2,056	146,796	322,277	1,684,760
1912—1913	163,589	1,502	178,630	332,782	407,803
1913—1914	66,723	1,739	126,980	350,603	1,529,210
1914—1915	42,847	1,446	77,337	84,320	126,638
1915—1916	30,369	1,466	72,783	71,075	177,978

In a work on "Woman's Place in Rural Economy," Sir Robert Patrick Wright, F.R.S.E., chairman of the Board of Agriculture for Scotland, wrote the year before the war broke out: "When we turn to Belgium we find schemes and plans of which our most enterprising and advanced educationists have never even dreamt in this country. There is nothing in Britain which corresponds exactly to the Belgian Schools for Domestic Agriculture, a designation in itself significant. It is very notable that in these schools, as in the famous Danish High Schools in Denmark, general education takes its place in the curriculum alongside of technical instruction."

PART III

Rural Science

SCHOOL FAIRS

PRINCE EDWARD ISLAND

BY W. R. REEK, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

EXHIBITIONS of school work such as drawing, penmanship, manual training, various collections, and latterly agricultural products have been encouraged for many years at all of the ordinary fall fairs, but not until this year were regular school fairs organized. Four only, were held, but they have been sufficient to give the necessary impetus required for any new movement.

The school inspectors and teachers have taken the initiative. The children have borne part of the work, but in the future they will be called upon to assume more responsibility in regard to, not only managing the fair, but in organizing early in the year for the growing of the material. The Department of Agriculture will assist when necessary in supplying seed and will undertake to do the

judging at the fairs, and to give general assistance, but in no case will they undertake the detail of organizing for fairs.

The prizes given were small and the money was raised locally in every case; in one instance the scholars prepared flowers and sold them by auction, thus securing sufficient for a small prize list.

Definite arrangements have not been made as yet, in order that these fairs shall be uniform throughout the province, but to keep all local colour possible, will be one particular aim.

Local initiative will be given every opportunity; every boy and girl will have a chance to take an active part, and, if possible, will be made to feel that the success of the fair depends wholly upon their efforts.

NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR OF RURAL SCIENCE SCHOOLS

THE interest in school fairs continues to increase in Nova Scotia. The centres of interest move somewhat from year to year owing to the change of teachers, but on the whole conditions are improving.

With one or two exceptions, the

exhibitions are organized wholly by the teachers. The central organization at Truro assists with suggestions. Local details, however, must rest with the teacher.

For the garden produce, the children buy nearly all their own seeds. The Government gives small quan-

tities of seeds in new districts; this helps awaken interest. We have found, however, that the small cost has not debarred any one from having a garden.

For the first time, we saved a considerable quantity of flower seeds this year from our Normal College school garden at Truro. These, we are giving to teachers who ask for them. We hope this will help pave the way for children to save their own seeds.

Two years ago, the Government gave eggs to school children. Last year, we sold them at half price. We are not yet satisfied with results. Accordingly, we shall try this year to induce children to buy good eggs at market price.

One hundred and thirty schools either held local exhibitions or sent their exhibits to some central point. Every county exhibition except one had a school-children's corner. In some cases it was small. In others, it was very creditable indeed.

At the best county exhibitions twelve to fifteen schools exhibited. In other instances only half-a-dozen were represented. Besides, many sections held local exhibitions for the first time; and others dropped out of the list because a rural science teacher had been succeeded by one not interested in such work.

About 5,000 children exhibited something, and their exhibits were seen by approximately 25,000 people.

In addition to the foregoing, we had, for the first time, a good rural science section at the provincial exhibition, Halifax. Thirty-seven schools were represented. Out of eighteen counties, fourteen were included in this exhibit. We consider this very good for the first attempt.

The children are allowed to exhibit anything they can make or collect or

grow. They are advised to adhere to the prize list offered—which is usually comprehensive—but are encouraged with special prizes for material not on the list. The strongest classes are vegetables, sewing and collections of wild plants.

Contests, sports, etc., have not been a strong feature. Lawrencetown has held a local fair for six years. This year, for the first, it expanded to a district fair, including six schools and introduced sports such as ball games and other athletics.

The women's institutes have assisted at a few local fairs. At county and provincial fairs, however, they have booths.

Possibly the most encouraging feature is the great improvement in the public contribution to prize funds. Two years ago, the Government contributed nearly \$300 and the public raised about \$200. This year, the government has been obliged to spend only \$175, while \$550 was raised locally. This shows a growing interest.

The local funds were raised by private subscriptions, entrance fees, sale of ice cream, etc.

Bridgetown made the best record, financially, this year. To indicate what can be done, I append this summary of their prize money:—

Private subscriptions	\$20.35
Advertising in prize list	11 00
Door receipts	49.43
Sale of ice cream	35 46
Sale of tea and cake	11 50
Flower guessing contest	3.00
Total	\$130.74

This is the first exhibition ever held in Bridgetown schools. They promise even greater success next year.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

IN the past exhibitions of school work have not been unknown in New Brunswick. Many years ago at provincial fairs creditable displays of school work were made. These included chiefly indoor products of school life. After the introduction of school gardening into our schools in 1904 the outdoor products of school effort were seen from time to time at agricultural exhibitions. Kingston exhibited at St. John, Sussex and Woodstock and other places at local fairs. On many occasions such exhibits were awarded prizes. Most of these, unless in the case of one or two provincial efforts engineered by the Education Department, had no close relation to school exercises. There was little or no organization back of them. They were merely incidental in the affairs of any school. Interest developed a few days before the date of the fair and subsided almost immediately thereafter.

After the passing of THE AGRICULTURAL INSTRUCTION ACT and the organization of the Division of Elementary Agricultural Education of the Department of Agriculture, nature study and elementary agriculture began to receive increased attention in the public schools of the province. The course of instruction in these subjects was revised. School gardening as a piece of apparatus, a laboratory, was incorporated in the course and real systematic extension work of a practical character began. This was in 1913. In 1914 at school district No. 21, Moncton, Mrs. S. I. Renton, teacher, the first school fair at which the provincial Agricultural Department figured took place. There was no judging of products, no prizes were given children. The arrangements were almost entirely local, the Department's official acting in an advisory capacity up to the date of the exhibition and being

present on that day and assisting in the programme. There was a large attendance of ratepayers and visitors. The district has a small number of children and at that time the grounds and school house were very ill-conditioned. This, however, marks the beginning of school fairs in New Brunswick and the influence has been felt.

In 1915 McQuade's had a fair similar to the one in 1914. It was more largely attended, some coming from a distance of twenty miles to attend it. The school garden was in good condition, the ornamental plots in front of the school house being particularly attractive. Mrs. Renton continued in charge of the school, and it was by her energy and zeal that so much was accomplished in the district.

Another fair was held this same year, -- at Middle Coverdale, Albert Co., -- Miss Emma A. Smith, teacher. This in many of its features resembled the one at McQuade's, but it marked a distinct advance. There was a prize list for products of both school garden and home plot work. A committee of judges made the awards, which were presented to the pupil winners at an educational meeting held in the public hall on the evening of fair day. The money for this purpose was provided through private contributions of the citizens of the district and their friends.

During these years the number of school gardens had greatly increased, home plots had multiplied, the purpose of such laboratories was coming to be better understood. The time seemed ripe to organize plans for extending and systematizing school fair effort, for utilizing their influence for community betterment that this kind of work suggested, for linking up home and school interests in a specific and definite manner, for training children to co-operate in the

industrial, social and business affairs of their locality. Accordingly provision was made by the Board of Education whereby the day or a part of it on which the fair was held might be regarded as time taught. The Elementary Agricultural Education Division took charge of the movement, consolidating effort, arranging for unions of districts for the purpose and planning to supervise the details on fair day. A prize list of a general character to serve as a basis of arrangement for fairs of all degrees and sizes was prepared and distributed. This was done last spring. Under this plan 12 fairs were held last fall—the first one being on Sept. 4th and the last on Oct. 13th.

It has been our purpose so far as possible to unite small districts, or attach them to larger ones, in order to foster a greater spirit of co-operation among the young. In this we have succeeded to a limited extent. We are not dissatisfied with results. In two cases—Jacksonville and Middle Coverdale unions of two districts were effected; at Millerton three districts united. The exhibits in all cases were conveyed to the centre by pupils or parents and at their own expense if any. Prize money was made up of amounts contributed locally and by the Department, the amounts varying according to conditions of number of schools united, the number of exhibits, the sums locally contributed and so on. In some cases no money prizes were given, only the Department prize cards and special diplomas.

At all these fairs this Division was represented by at least one official, who assisted in preparing and arranging exhibits, numbering entries and making lists, assisting in judging, addressing the pupils and visitors, and, in general, endeavouring to keep a uniform plan of action. Prize tickets, envelopes, certificates for special merit were all provided by the Department. Pupils provided the exhibits from the school gardens, home plots and other projects and

indoor school room work, they assembled the material and obtained the necessary fixings for arrangement; the districts supplied a portion of the prize money; and this Division of the Department of Agriculture did the rest. A school room or an assembly hall was used as place of exhibition.

At some of the fairs held, sports and games were participated in by pupils; in some cases contests were held and small prizes given to successful competitors. In these features too this Department directed the programme.

It will be noted that the Education and Agricultural Departments have joined hands in developing the entire scheme of community improvement through the school by the use of agricultural instruction and the related social and industrial work thus made necessary.

In a general way four classes of exhibits were shown at fairs as follows:—

1. Educational (including maps, compositions, arithmetical work, local geography and history, mounts of plants and insects, etc.)
2. Vegetables, cereals, flowers (wild and cultivated) from school gardens and home plots.
3. Manual work (including wood and cardboard work and domestic science).
4. Other home project work supervised and directed from the school.

It is required that all classes of exhibits be represented by instruction in the school that makes such entries.

Below will be found statistics relating to the 12 fairs held:

Number of children making entries . . . 430

ENTRIES

1. Educational, including mounted plants, insects, essays, drawings, maps	315
2. Vegetables, cereals, etc	578
3. Domestic Science and Manual Training	150
4. Home project work	36
Estimated attendance	700

All children making entries must have been enrolled pupils of the school during some part of the school year.

Our experience in the past suggests many improvements and conditions to our plans. It proves to us that school fairs under careful regulations provided through the Agricultural and Education Departments can be made a means of broadening the view point of our people and of extending the usefulness of the schools.

They can be made to help. In future all exhibitors will be required to sign a declaration that their entries represent their personal work and teachers to state that the entries of all pupils are either school work or home project work supervised by them and thus connected with the school.

QUEBEC

BY JEAN CHARLES MAGNAN, B.S.A., SUPERINTENDENT OF SCHOOL GARDENS

THE school garden movement in the province of Quebec was inaugurated in 1903 by Mr. O. E. Dalaire, now director of the St. Hyacinthe Dairy School. Since the inception of this movement, the teaching of agriculture has made great progress in our rural schools. Among the systems that have been the most fruitful in beneficial results, the school fair, supplementing as it does, the class room work in agriculture and the practical work in school gardens, deserves to be mentioned in the first place.

Every year, seed grain and prizes for children-gardeners are distributed by the Quebec Department of Agriculture to all schools where agriculture is taught. Teachers and school trustees keep in touch by correspondence with the school garden division of the Horticultural Branch of this Department. On the other hand, the reports from the school inspectors keep us well informed as to the work of the school gardens.

The district representatives, school inspectors, teachers and school trustees, under the direction of the superintendent of the school gardens, are constantly organizing school fairs (1).

(1) The rural science section of MacDonald College largely contributes, also, to the success of the school gardens and school fairs.

In the spring, 8,200 packages of vegetables and flower seeds were distributed to the schools maintaining gardens and which had been reported upon favourably by the inspector. This seed was sent to the teachers by mail, for distribution to the children-gardeners, cultivating a home garden.

This year, there were 37 school fairs organized by as many schools against 29 last year, showing an increase of 8. The following statistics relate to the 36 school fairs which were held this year in September and October:

RURAL SCHOOL FAIR STATISTIC

Number of school fairs	37
Number of children exhibitors (boys and girls)	5,749
Total number of schools taking part in the exhibitions	349
Total approximative number of visitors	34,830
Number of prizes distributed to the children	4,501
Amount of cash prizes granted by the school boards, the agricultural societies and tax-payers	\$256.28
Total number of exhibits presented by the children	10,900

The products shown were as follows: vegetables produced on school or home gardens, fruits, domestic work, oat, wheat and barley sheaves, canned goods, preserves, reports on the school gardens kept by children-gardeners, etc.

Although prizes are granted by the Department of Agriculture to

the children securing first place in the school fairs, it may be stated that school boards are also doing their share in this connection. The reports received show that an amount of \$256.38 was subscribed by the school boards (1). This money was secured by the following means: the teacher or the district representative explained to the school trustees the object of the school fairs and asked for a certain sum of money to

school fair in every parish, wherever possible. The teacher should be supplied with a small sum of money, in proportion to the funds of the municipality, to purchase prizes for the pupils who take good care of their gardens and win awards at the fair.

We are very much in favour of school fairs as they create great emulation among the pupils, encourage them to study agriculture



SELECTION OF LEGUMES FOR THE SCHOOL FAIR UNDER THE SUPERVISION OF
PROF. MAGNAN, ST. CASIMIR QUE.

be distributed as awards to the pupils obtaining first prizes at school fairs. In justice to the school boards, it should be stated that most of them made a generous answer to this request.

It is to be hoped that the school boards and tax-payers will realize the necessity of having an annual

(1) The total figure will certainly be above \$300, when reports have been received from all school fairs.

and make them take an interest in their home gardens. But their beneficial results are not limited to the children, they also extend to the parents. The parents are made to realize that the school is their work, that the teacher is their most valuable assistant, that the children need their encouragement and their support and that the teaching of agriculture at the school, in the different classes, is of very great value.

MACDONALD COLLEGE

BY J. EGBERT MCOUAT, B.S.A., DEMONSTRATOR TO RURAL SCHOOLS

THIS institution has, in the past, carried on the organization of its fairs entirely through the demonstrators stationed by the College in various counties throughout this province. The demonstrators visited the schools, obtained from the pupils a list of the material which they wished to procure, and then forwarded this list to the College where the material was prepared by the Horticultural, Cereal, and Poultry Departments and shipped out as early as possible in the spring. The seeds and eggs were then distributed along with directions as to growing and care.

This year the same policy was followed as far as outlined above, but, owing to the withdrawal of most of the demonstrators for a time, due to unfavourable circumstances, a different method was subsequently followed.

In those counties where provincial demonstrators were appointed to succeed those from the College, the plots were visited and the fairs organized by them in much the same manner as heretofore. In counties where there were no demonstrators, the fairs were organized by the Rural School Department of the College.

In the work of carrying out all fairs, however, the strongest of co-operation was evident between the provincial demonstrators and the workers from this institution, the former helping at fairs where there was no demonstrator and the latter supplying judges and assistance to the provincial demonstrators.

A large part of the funds needed to provide prizes, print prize lists, etc. was obtained from those school boards which had schools taking part in the fairs, and the generosity of all boards interviewed was one of the features of the year's effort. In addition many individuals sub-

scribed liberally, and in one or two cases the entire prize list was paid for by one public-spirited person.

The Department of Agriculture was most liberal, making grants, varying from twenty-five to fifty dollars, to several of the fairs.

Special mention should be made of the efforts of the Homemakers' Clubs, some of which subscribed liberally, not only to the general funds, but also providing special prizes in such classes as cooking and sewing.

The use of halls, schools, etc., in which to hold the event, was in every case given free and every effort was made to supply the necessary tables, stands and seating.

No contests were held this year at most of the fairs, and sports were held only at two. This latter feature is one which will be developed much more in future for two logical reasons. First, it pleases the children and adds an additional item of enjoyment to the events of the day; secondly, it clears the hall or room where the judging is being done without any hard feeling being created and enables the judges to work much more rapidly and in peace. The prizes necessary are easily collected by "passing the hat" and only a little more thought and preparation is needed to make this not only an enjoyable but a necessary adjunct of every well-organized fair.

The classes of material, the varieties, and the numbers of samples which were distributed are shown in the following table:

<i>Class</i>	<i>Variety</i>	<i>Samples (approx)</i>
Oats	Banner,	107
Barley	Mensury,	90
Corn	Quebec Yellow	
	No. 28,	125
Swedes	Bangholm,	110
Potatoes	Green Mountain,	
	Irish Cobbler,	600

Flowers (collection)	Sweet Peas,	750
	Phlox,	
	Asters,	
	Snapdragon,	
Tomatoes	Alacrity,	200
Corn	Early Malcolm,	150
Eggs.	Barred Plymouth	
	Rock—531 settings.	

The classes in the household science division were well contested wherever held. These varied in many fairs so that they cannot be enumerated. A new feature was introduced this year in the cooking class at several of the fairs whereby each girl is required to make her cake, candy or bread from a standard recipe. A bulletin issued by the Household Science School, Macdonald College, contains minute directions as to the methods and materials to be used. These booklets are issued free to the pupils and where they are employed the cooking must be done according to these directions. This plan has produced a uniformity of exhibits often lacking in the past, and has also made the work of judging much easier than where every kind of cake or bread was shown. Next year it is expected

that this system will be uniformly adopted.

The miscellaneous class also varied according to locality and funds available. One section in this class which proved an attractive one was the best collection of five vegetables from the home garden. Collections of weeds and weed seeds were also included, but more demonstration work among the pupils must yet be done to make these sections a success. Compositions were also asked for on such subjects as: "How I grew my plot" and "Why I think agriculture should be taught in country schools."

Much has been learned during the past season and many changes will be made during the coming year. The success of this year's work makes all doubly eager to strive for still greater results next year. To do this we must cast aside many doubtful methods and employ those learned by experience to be more reliable and more productive of good results.

The table herewith submitted summarizes the fairs held during the past year:

SUMMARY OF FAIRS HELD

FAIR	County	Number of Schools	Number of Exhibitors	Approximate Attendance
Cookshire	Compton	27	302	700
Scotstown	Compton	17	161	400
West Bolton	Brome	6	65	200
Cowansville	Missisquoi	7	84	200
Richmond	Richmond	20	278	800
Danville	Richmond	11	113	300
Lennoxville	Sherbrooke	26	405	750
Huntingdon	Huntingdon	22	300	700
Howick	Chateauguay	10	225	300
Hemmingford	Huntingdon	5	100	175
Shawville	Pontiac	14	125	500
Bristol Corners	Pontiac	12	85	250
*Chapeau	Pontiac.	14	250	600
	Totals	191	2,493	5,875

* At Chapeau the school fair was held in connection with the agricultural fair. This aided in swelling the attendance at that fair.

OBSERVATIONS MADE WHILE VISITS TO POTATO PLOTS IN SCHOOL FAIR COMPETITION WERE PAID

BY J. HAROLD MCOUAT, MACDONALD COLLEGE

IN connection with two school fairs held in Brome and Compton counties in 1916, all the plots of cereals, potatoes, etc., being grown by the children were visited. The object in calling to see each plot was to determine how each was being cared for. At every place questions were asked as to the general care and also as to the treatment of seed and soil. Any points of value with regard to the potato crop, that were gathered by means of such questioning are as follows:

Almost all the children had chosen soil that was comparatively well-drained. This was very necessary last year because of the late, wet spring. In almost every case manure was applied to the soil, more often in the spring than in the fall. Acid phosphate proved to be a popular fertilizer. It was placed in the hills, or along the row, just before the potatoes were planted.

The seed was planted without any formalin treatment being given it, except in one instance. One boy soaked his seed in formalin, but did not get satisfactory results. That might have been due to lack of strength of formalin or to infected land.

With regard to the treatment of the growing crop, a lot of honest work was done by the children. Every plot was Paris-greened. All this was undertaken by the children and was done as well as could be expected. Some of the older boys applied Bordeaux mixture as directed and in every case the benefits could be

plainly seen. Some children had not applied the Bordeaux mixture thoroughly or had begun too late in the summer. This late start always proved that the spray must be applied early in the season and that throughout the season it must be applied regularly. Where both Bordeaux and poison had been correctly applied, the stand of the shaws was even, free from bugs, rust and blight, and the tubers were almost always of an even size and fairly free of scab. When little care was exercised to have the plot clean in any respect, diseases of nearly every kind could be seen. Rust was common on the plots that were not treated with Bordeaux and in several instances the blight was bad. One plot was ruined absolutely by a blight. Within ten days after it first appeared, this form of blight blackened and withered the whole plot to a few blackened stems. The tubers were also shrunken.

Almost all the plots visited this year were affected in some way with scab. In some plots the potatoes were literally covered with it. What was a big surprise was the amount of clean potatoes that were shown at the fairs. In conclusion, it is gratifying to know that, in almost every case, the prize-winning potatoes came from the prize-winning plot,—the plot which had been planted in well chosen soil, which had been properly planted, hoed and cultivated, and which had been given thorough applications of Bordeaux mixture and Paris green.

ONTARIO

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

THAT the rural school fair is bound to be a permanent factor in our agricultural development has been proved decisively by the results of the past

season, when, in spite of unfavourable conditions, the fairs in interest and number surpassed all previous records. The following table gives a comparison with 1915:—

	1915	1916
Number of fairs held	234	275
“ schools included	2,291	2,620
“ children taking part	48,386	60,262
Attendance of children at fairs	72,860	83,029
“ adults	84,406	95,217
Total attendance	157,266	178,246
Number of entries	116,236	113,263
“ “ home plots	51,243	55,947



CONTESTANTS IN BOYS' HORSEBACK RIDING CLASS AT A RURAL SCHOOL FAIR

It will be noted that there were not as many entries at the fairs this year, which is due to the unfavourable weather conditions which prevailed during the season, resulting in some of the children's plots being failures.

In organizing rural school fairs in Ontario an effort has been made to confine the school fair associations to township boundaries, but it is frequently necessary to include a school from another township which is too far away from the other schools in the township in which it is

located. The number of schools in each school fair association varies considerably, the average being about ten.

All the seed used by the children is supplied by the Department free of charge. A special effort is made to supply only first-class seed of the most desirable varieties. Early in the year application forms are mailed by the District Representatives to the schools to be filled out and returned. Seed material is usually distributed by the District Repre-

sentative personally, as it gives him a splendid opportunity of becoming acquainted with the teachers and children and explaining the school fair plans for the year.

The school fairs in Ontario are financed by the Department of Agriculture with the exception of the prize money. This is secured locally, a grant being made by each School Board. In many counties the County Council makes an annual grant for school fairs. Township

live stock, and classes in domestic science and cookery for the girls.

In conducting a school fair a special effort is made to have the children take an active part in the management. Committees of pupils are appointed to take charge of the various departments, so that they may have some knowledge of how a fair is conducted. All exhibits are required to be in place by eleven o'clock on the morning of the fair, at which time the building is cleared and



DINNER HOUR, NORWICH SCHOOL FAIR, NORWICH COUNTY, 1916
Lunch being served by the Women's Institute and Officers of the Rural School Fair Association

Councils have also contributed very largely, not to mention public-spirited men who have offered splendid prizes, which have aided very materially in increasing the interest among the pupils. The prize list for the average school fair would represent from \$80 to \$100, and includes classes for oats, barley, potatoes, mangels, sweet corn, ensilage corn, vegetables, such as onions, carrots, beets, turnips, etc., poultry, weed and insect collections,

the judges begin their work. The sports usually begin about one-thirty and continue until three-thirty, when the exhibits are open for inspection. The judges, who are specialists in their various lines, give reasons for their placings and, in this way, assist materially in improving the exhibits from year to year. This is usually followed by the children's public speaking contest and addresses by prominent men, who may be guests of the association.

During the past season in some counties where school fairs are well established, a county school fair was held in co-operation with the county agricultural society fair. These county school fairs are designed for the purpose of giving the winners in the various township school fairs an opportunity of competing against each other. In every case where this scheme has been adopted it has proved very successful, and has been a prominent feature of the agricultural society fair. It is hoped that in time it will be adopted in all the counties of the province, and then perhaps some arrangement might be made whereby winners at county school fairs would have an opportunity of competing for provincial prizes.

It will be remembered that last year the children connected with the rural school fairs grew potato war plots and raised sufficient to pur-

chase a motor ambulance, which was presented to the Red Cross and is now doing duty at the front. This year the Department purchased specially designed patriotic buttons and arranged for the children to conduct a tag day in connection with each school fair. After paying for the buttons there is a balance of over \$2,500 to the credit of the Rural School Fair Patriotic Fund. This amount, however, also includes proceeds from refreshment booths conducted by the children and a portion of the proceeds from booths conducted by the women's institutes at the fairs.

Too much cannot be said in appreciation of the hearty co-operation and untiring efforts of the school inspectors, trustees and teachers, for without their assistance the rural school fair movement could not have been so successful.

MANITOBA

BY S. T. NEWTON, B.S.A., DIRECTOR OF EXTENSION SERVICE

DURING the year 1916 boys' and girls' club work made splendid progress in the province of Manitoba, and while considerable free material was supplied and liberal assistance given to supplement the funds locally, the results obtained more than justified the expenditure.

Owing to the fact that nearly all of the District Representatives answered the Call of the Nation, it was necessary to depend on the public school teachers and local business men and farmers for the organization of this work, and liberal support given to the movement by the Department of Agriculture enabled them to accomplish the task in a way that was highly gratifying not only to the Department of Agriculture and the children themselves, but to the parents as well.

Able support was given by members of agricultural and home economics societies, and the managers of the various branches of the Bank of Commerce, and it was due to their interest that there were so many pigs in evidence at the fairs, fully 700 being raised altogether. At Dauphin and Virden, for instance, there were 46 pigs at each place, and as each exhibitor had the full record of weights, feeds, costs, etc., from the time that the pigs came into his possession until the day of the fair, the visitors were deeply interested in the reports obtained, and the results from the various kinds of feeds used.

In Manitoba all contests were open to both boys and girls, and it is well that it was so, as in many cases prizes were won by the girls, and several now have a nice little bank

account from the proceeds of their pigs and chickens.

At several fairs there were over 100 exhibits of chickens, each averaging four or five to the pen. At Minnedosa there were 150 pens on exhibition, and while at first it seemed that 100,000 eggs was a pretty big order to supply free, yet, through enrolling the members in the chicken contest, they were encouraged to take on other less attractive contests such as fodder corn growing, sewing, baking, pig raising, potato growing, and weed contests.

that they are performing a real live part in the work of the farm and home, and are really partners in the business.

"One of the commendable features of the boys and girls club work in the province of Manitoba, where the rural population is comprised of so many nationalities, is the fact that they are all brought together to work under similar conditions, with the same object in view. The movement is receiving the support of the leaders of every political faith, and Ministers of every known religion in the



DAIRY CALF CONTEST AT THE TREHERNE BOYS' AND GIRLS' CLUB FAIR

Through boys' and girls' club work in Manitoba, thousands of dollars were added to the wealth of the province, and the earning power of the families increased to the same extent.

But while the work of the boys and girls can be justified from an economic standpoint, its greatest benefits were secured along other lines, such as the greater interest taken in the school by the parents, and in the home by the teachers; by the increased love of agriculture and other phases of farm life aroused in the boys and girls; by the greater knowledge which they have of the various varieties of poultry, pigs, corn, grain, etc., and by arousing in them the consciousness of the fact

province. This unifying of the powers that be in the province must prove a tremendous force in fostering higher Canadian ideals in Canadian Citizenship."

A feature of boys' and girls' club work that was particularly encouraging was the production of pure seed, and fully 200 half-acre plots of grain had been inspected and found extremely satisfactory, but at the last moment these plots were struck by rust, and as was generally the case throughout the province last year, the most promising plots were the most affected by rust, but notwithstanding this set back, 75 percent of the boys have already again enrolled for this contest this year, so pleased were they with the interest

taken in their work by the Field Husbandry Department of the College.

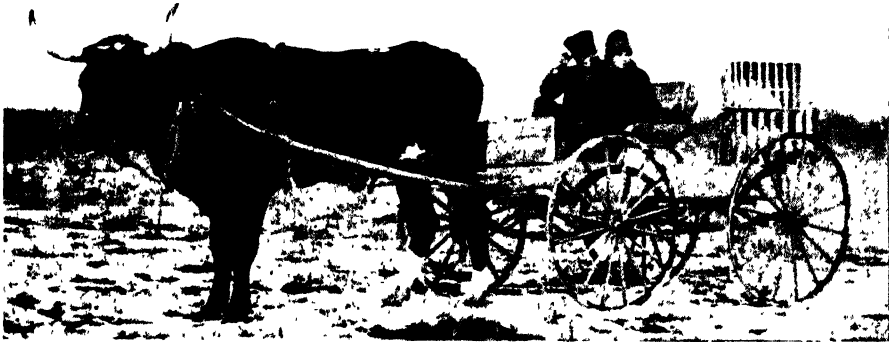
Instances are not rare where a particular phase of farm work, such as chicken-raising and pig-raising, has been given over almost entirely to a club member, and hundreds of requests have been received for literature on these subjects.

The most widely-read bulletin in Manitoba, even by the grown-ups, was the one relating to boys' and girls' club work, and this has induced the heads of Departments at the College to prepare a series of bulletins especially for the boys and girls, and we have no hesitation in assur-

ing in organizing the club, and branches were then established at each of the rural schools, and received the hearty support of the teacher and the trustees.

The plan most generally followed was to combine the school fair and the boys' and girls' club fair. The senior pupils in the collegiate department took charge of the sports, which were run off while the judging was in progress.

The local organization provided all the prizes for the school work and the sports, and half the prize money for the agricultural and home economics sections, the Department of Agriculture supplying the other



TWO RUTHENIAN BOYS BRINGING THEIR CHICKENS, POTATOES, ETC., IN TO THE SIFTON BOYS' AND GIRLS' CLUB FAIR. THEY DROVE SEVERAL MILES

ing them that this is the best medium through which to reach the parents, as each one is more interested in his boy's success than his own.

The plan followed was to co-operate with the teachers, school inspectors and business men, and the remarkable results obtained were due for the most part to the work of the public school teachers and inspectors of the province. Usually a business man at each place was found who was interested in the young people, and was willing to devote considerable time to the organization of the ten or twelve schools near his town or marketing centre. The principal in the town school assisted

half. The Department also supplied judges for all the fairs, the whole poultry staff at the College spending fully three weeks in judging at the fairs.

In general, the trustees at each school contributed \$5 or \$10 to the prize list, and many cash donations were received from individuals. The fact that the Department was backing its own idea with liberal support induced the local people to do the best they could in support of the movement.

An effort was made last year to supply members in all parts of the province with eggs and to encourage them to take good care of their

chickens and supply eggs for their own members during the coming and successive years. It was felt that one child should have as good a chance as another, consequently no limitations were made as to the number to receive eggs at any one school. Each contestant who received eggs was required to take part in two other contests. The number of eggs supplied was approximately 114,504, and the price paid was 6 cents each. This will not have to be repeated next year, and fully 5,000 pupils will take part in this contest

800 branch clubs, with a membership of 13,000, and 110 fairs were held at which there was an attendance of approximately 35,000 people.

The fact that an organization of this magnitude had to be organized and managed mainly by volunteer assistance, made necessary more liberal assistance from the Department of Agriculture, but judging by the general interest created along agricultural and home economics lines, and the fact that other agricultural work bids fair to lead to far reaching results in other kindred



RUTHENIANS UNLOADING EXHIBITS FOR THE BOYS' AND GIRLS' CLUB FAIR AT ETHELBERT, MAN., ONE OF THE MOST POPULOUS OF THE FOREIGN DISTRICTS.

next year with eggs supplied from their own flocks.

Altogether the free supplies given out amounted to the following:—

9,542 doz. eggs @ 72c per doz	\$6,870.24
78 bush. wheat @ \$1.65 per bus.	128 70
11 " oats @ 80c. per bush.	8 80
14 " barley @ \$1.00 per bus.	14 00
8,036 ¼ lb. pkgs. corn	80 36
4,800 ¼ " " peas	162 90
Grants to Fairs paid on Agricultural and Home Economics Exhibits.	2,586 90

Total..... \$9,851.90

There were 115 central clubs and

lines of effort, and the fact that the Agricultural College now has a very effective connection with all parts of the entire province, would seem to indicate that in using funds supplied by the provisions of THE AGRICULTURAL INSTRUCTION ACT for this purpose, splendid results were being obtained in encouraging the younger people to take an interest in agriculture and home economics, as they will be required to take their place in the world's work several years earlier than would have been necessary under normal conditions.

SHORT COURSES IN WOODWORKING AND SEWING

During July and August, 18 short courses in agricultural woodworking were held, which were attended by approximately 400 boys, who brought with them such tools as they could find on the home farm. These were supplemented by a few tools which the Instructor brought with him. With such lumber as could be obtained locally, and roughly constructed benches, each boy made from three to six serviceable articles, such as chicken brooders, exhibition crates,

ance and the quality of the work done was equally satisfactory.

Each course extended over a period of two weeks, and for the most part the services of manual training teachers from the Winnipeg public schools were secured for the woodworking courses, and the regular extension staff for the sewing courses.

The aggregate attendance at these courses was 5,220.

At Souris the short course took the form of a boys' camp. The Souris School Board supplied tents and



CONVENIENT AND USEFUL FARM CONVENIENCES MADE BY THE BOYS IN PICTURE
AT THE AGRICULTURAL WOODWORKING COURSE AT WINKLER, JULY, 1916

milking stands, farm gates road planers, etc., were most in evidence. In general, local school boards paid for the material, but some of the best work was done where packing boxes constituted the main source of supply.

As the thermometer stood above 70 degrees for the greater part of the time, and the boys voted this innovation a splendid holiday, we can safely assume that the work was of a profitable nature.

Ten short courses in sewing were held for the girls, and the attend-

part of the camp equipment. The boys brought with them blankets and such food as they required. They cooked their own meals, and, in general, were under strict military discipline.

From 9 to 12 and 1.30 to 4 the boys were engaged in wood-working, while the evenings were given to sports, such as swimming, water polo, football and rambles about the districts. A few lectures on agriculture were given by college graduates living in the district.

NORTHERN SASKATCHEWAN

FRED W. BATES, B.A., M.Sc., DIRECTOR OF SCHOOL AGRICULTURE

THE school fair has demonstrated its value and the movement continues to grow at a rapid rate. As it is now recognised to be an important phase of educational work, directly dependent for its true success upon the teacher in the school, the Department of Education has undertaken the general direction of the movement and, during the past year, a definite attempt has been made to guide the work already begun as well as to organize new centres of activity. The inspectors of public schools have rendered invaluable service to the directors of school agriculture in the development of this work by organizing school fairs in their inspectorates.

During the year a simple form of organization known as the Rural Education Association has been formed in many districts. Primarily these organizations consist of the teachers and representatives from each school district in a municipality, or portions of several municipalities, contiguous to a common trading centre. Further, all other persons in the district interested in boys' and girls' work are urged to become members, so that by linking up the various agencies interested in junior educational agriculture a definite policy for the community may be formed, resulting in conservation of energy and continuity of effort. There are now 16 of these associations in Northern Saskatchewan which comprises twelve public school inspectorial districts lying north of the South Saskatchewan and Qu'Appelle river. Five of these were the outgrowth of previously existing school fair associations, while the remaining eleven were organized for the first time during the past year. Twelve associations held successful school fairs.

The introduction of the school fair in any community is usually

the work of some interested individual. In this regard the public school inspectors have done valiant service. In teachers' conventions and in contact with the individual teacher and school board, they have done much to foster the movement, and in many cases have taken a direct part in the organization of the fair itself. This has led the teachers in convention in three of the twelve northern inspectorates to organize their whole district for the coming year, so that every pupil in every school may have opportunity to take part in a local school fair and, possibly, in the final, for the inspectorate where the best from the local fairs will meet in competition.

It must be remembered, however, that the country is large and extensive sections are still unorganized. In these portions valuable pioneer work is being done by individuals who have seen the value of the work and are willing to give lavishly of their time and energy to inaugurate the movement. Frequently the organization of a fair is due to the local grain growers' association or the homemakers' club, while in other cases this work has been done by the agricultural secretary of the municipality or the District Representative of the Department of Agriculture. Needless to say, no matter who acts as organizer for a school fair, the District Representative always renders valuable assistance in carrying out the work.

The usual method of procedure has been to call together the teachers with representatives of the school districts interested. The work is then explained by some representative of the Department and the initial organization effected. Various committees are named, contests formulated, premium lists and regulations drawn up, subscriptions and special prizes solicited, and the work

carried to a successful issue by local enterprise. This assumption of responsibility by the local community has resulted in the development of remarkably strong and effective school fairs.

In Northern Saskatchewan 33 school fairs have been held during the past year. At five other points exhibitions of school work have been shown in connection with the teachers' convention. Incomplete returns show that at 13 of these fairs, 1,315 children from 107 schools took part, making 4,015 entries. It is estimated that at least 200 schools and over 2,000 children have taken part in the school fairs of Northern Saskatchewan during 1916, while the total attendance must have exceeded 5,000.

The number of schools uniting for fair purposes vary greatly. The largest fair of the season was held at Rosetown, where some 225 children from 29 different schools entered 700 exhibits in competition, while the people in attendance numbered 500. The smallest—a one-room country school fair—had an attendance of fifty with 12 children competing.

Practically all of the associations in existence in 1915 continued the work during the past year with increased success. The Lost River Association, of which an account has appeared in THE AGRICULTURAL GAZETTE, was this year larger than in any previous year. The influence of this organization is shown by the development of similar ones in two of the adjoining municipalities.

The school fair should touch every phase of the work of the school. School gardening, school agriculture and all kindred work should not be regarded as ends in themselves, but should be so correlated as to render the traditional subjects of study more interesting and vital to the child. It has been the aim, therefore, to make these exhibitions represent as far as possible all aspects of school activity.

The following indicates the range of a typical school fair:

Class I.—Vegetables: 15-20 varieties, arranged in sub-classes according to the age of the pupil. Individual and school collections.

Class II.—Flowers: 5-10 varieties, arranged in sub-classes according to the age of the pupil. Hanging baskets, window boxes, etc. Individual and school collections of wild flowers, pressed flowers, weeds and weed seeds.

Class III.—Grains: Best sheaf of the various cereals. Forage crops: best sheaf of alfalfa, corn, etc.

Class IV.—Household science: Bread and biscuit making; preserving and canning; butter-making; plain sewing, mending, darning, hemming; hand-made garments.

Class V.—Manual training: Milking stools, chicken coops, etc.

Class VI.—Ordinary school work: Arranged according to the grades, usually with three competitions for each grade. Lower grades: Modelling, writing, paper folding. Upper grades: Map drawing, composition, writing and art.

Class VII.—Contest and club work: Poultry raising, pig feeding, corn or potato growing; Bread or butter-making.

No school fair is considered complete without sports or games. The principle enunciated above demands their inclusion, since play is regarded as a definite part of school life. The regular field sports are usually held during the judging of the exhibits and create a great deal of interest. In many cases a baseball or basketball tournament forms part of the day's programme.

During the past year no direct financial assistance has been given by the Department. Where possible, however, officials of the Departments of Education and Agriculture, and members of the College of Agriculture staff, have assisted by acting as judges and by the giving of public addresses. The fairs in all cases have been financed locally. Municipal councils and school boards have given grants in almost every instance, while the balance required has been raised by subscription, or by the sale of advertising space in the prize list. The financing

of the school fair has proven very easy of accomplishment.

No general attempt has been made to organize clubs or contests, but in many instances these have developed locally. The municipal agricultural secretaries and the district representatives have taken an active part in this feature of the work. Further, a number of organizations, such as grain growers' associations and homemakers' clubs, have rendered valuable assistance by supplying material and providing special prizes for such contests. Conditions vary so much throughout the country that this matter must be governed very largely by local peculiarities. However, in the not distant future

this phase of work must receive much more definite attention than is being given to it at present.

A feature of the work for boys and girls closely related to the school fair, is the increasing interest taken by agricultural societies in junior exhibition work. Scarcely an agricultural fair is held in the province that does not provide a number of opportunities for boys and girls, not only in connection with agricultural work, but also with the ordinary school activities. All the larger exhibitions in the province during the past year featured this school work, providing valuable prizes and shields for both individual pupils and for school collections.

SOUTHERN SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

FROM the increased number of school fairs and the general interest in the movement exhibited by pupils, teachers and parents, it is evident that the school fair became decidedly popular during 1916. There can be no doubt that, as the aims of the movement are better understood and the organization gradually improves from year to year, the school fair will become a permanent factor in the educational work of the province.

The Directors of School Agriculture have been unable to attend all of the fairs, but have received reports on 51 in the southern and 33 in the northern part of the province, making a total of 84.

BASIS OF ORGANIZATION

In the January (1916) number of THE AGRICULTURAL GAZETTE it was stated that as a result of the recommendations of the Directors the Department of Education had adopted the policy of encouraging the formation of rural education associations consisting of teachers, school trus-

tees and others interested in educational matters in the municipalities of the province. The organization of the school fair was suggested as one of the important phases of the work of such associations. This policy has met with considerable success and over forty associations have been organized by the directors, inspectors of schools and teachers interested in the work. With very few exceptions each association has held one or more school fairs during the year. However, no attempt has been made to limit school fair work to rural education associations and every encouragement has been given to other organizations to continue the work, which had been so successfully carried on in other years.

Those fairs, which have been conducted under the auspices of the rural education associations, have usually been managed by a committee appointed by the association. All the schools in the municipality or area covered by the associations were invited to take part and the fair was usually held at some convenient centre.

METHOD OF SUPPLYING MATERIAL AND QUANTITIES SUPPLIED

By arrangement with the Department of Agriculture a supply of seeds for school gardens and experimental plots was obtained, from which schools were able to purchase their requirements. No material was supplied free of charge, but over 200 schools took advantage of this offer of the Department and obtained a reliable supply of seeds at a reasonable cost.

districts, in each of which a school fair was held. From four to thirteen schools contributed to the success of the fair at each centre. The dates were so arranged that all these fairs were held between the 25th and 27th of September in order that the best exhibits from each fair could be forwarded to Yorkton, where the fair for the whole inspectorate was held on September 29th and 30th. This was the largest fair held during the year in Sas-



SCHOOL FAIR, LANG, SASK.

NUMBER OF FAIRS AND NUMBER OF SCHOOLS TAKING PART

In Southern Saskatchewan 13 school fairs were conducted by rural education associations, one for each unit of organization. The number of school districts taking part in these fairs varied from 2 to 13, the total being 105. In addition, 38 fairs were conducted by means of other organizations, of which those in the Yorkton and Estevan inspectorates are worthy of special mention. Inspector Anderson and the teachers of the Yorkton inspectorate formed themselves into an association for this work and as a result the inspectorate was divided into 18 dis-

katchewan, 44 districts taking part and over 4,000 children and parents attending. In the Estevan inspectorate a somewhat similar method was adopted, teachers at 11 central points organizing fairs for the schools tributary to such points.

Other fairs were conducted by individual schools, homemakers' clubs, agricultural societies, agricultural secretaries and teachers' associations. As no record has been kept of the actual number of children exhibiting at the fairs it would be a rather difficult matter to give an accurate estimate, but it would appear that at least 8,000 children made exhibits at school fairs in

Southern Saskatchewan during the year.

The Department suggested that competitions be open to boys and girls under 18 years of age residing in a school district which had paid the entry fee to the fair, but local organizations were, of course, at liberty to make their own regulations in this respect. Altogether, about 8,000 children representing some 250 schools made approximately 30,000 entries at the 51 school fairs which were held in Southern Saskatchewan.

Class (C)—9 divisions, handwriting, drawing and composition.

Class (D)—7 divisions, domestic science, including sewing, baking and preserving.

Class (E)—14 divisions, manual training.

Class (F)—2 divisions, poultry.

Local organizations, however, were at liberty to make their own arrangements and the prize lists were, therefore, many and varied.

METHOD OF FINANCING, PRIZES, ETC.

This matter was left entirely to those responsible for the individual



SCHOOL FAIR, YORKTON, SASK. 1916

CLASSES AND PRIZE LISTS

The prize list suggested by the circular prepared by the Director of School Agriculture, consisted of six classes as follows:

Class (A) 6 divisions, rural school grounds, individual garden plots, collections of flowers and vegetables grown in school garden; collections of native grasses and weeds and school collections of weeds, properly pressed, mounted and named.

Class (B)—21 divisions, vegetables and flowers, the product of the exhibitors' work in school and home garden.

fairs, but the Directors suggested that as far as possible it would be wise to encourage the pupils to enter into competition for the honour attached to success rather than for a money prize awarded as a result of it. In many cases badges or ribbons were used to denote prize winners. The most popular badge consisted of a button $1\frac{1}{2}$ inches in diameter, gold satin finished, having the Saskatchewan coat-of-arms, and attached to the button a satin ribbon on which was indicated the nature of

the prize, the name of the school fair and the date. Although ribbons and badges were used at most of the fairs yet in several cases more valuable prizes were awarded. These were provided by contributions from parents, trustees and others interested in the work of the children. A great variety of prizes was noticed, including silver cups, shields, books, garden tools, and cash.

SPORTS AND GAMES

At several of the fairs the afternoon of fair day was devoted to contests in athletics, football, basketball, etc. These sports add interest to the fair and create wholesome competition between schools, which is of particular value to the pupils when the contests are so arranged that the pupil finds himself working for his school, rather than for himself.

APPROXIMATE ATTENDANCE

As already mentioned, the attendance was greatest at Yorkton, where 4,000 people visited the fair. For the other 50 fairs held an average attendance of about 200 would be

a conservative estimate: thus the approximate attendance at school fairs in Southern Saskatchewan would be 14,000.

THE EDUCATIONAL VALUES OF THE SCHOOL FAIR

It is important that the educational values of the school fair should be always kept prominently before the pupils and parents. The fair brings parents, teachers and pupils together and gives to the general public an opportunity of exhibiting its interest in the work of the schools. The exhibits are mostly the result of the practical work of the pupils and, therefore, the fair tends to encourage the practical in educational work. The competition should be regarded merely as a stimulus to such practical work and should not be allowed to become an end in itself. This is the danger and it should be guarded against by all those taking part in the work. When the competition becomes too keen—and this often results from expensive prizes—the educational and moral values of the fair are apt to be overlooked.

ALBERTA

BY J. McCAIG, EDITOR OF PUBLICATIONS

DURING the year 1916, the Department of Agriculture organized a District Agent Service, which has charge of the work of school fairs. While there have been a few other fairs under the auspices of local groups of the United Farmers of Alberta, the women's Institutes, or smaller associations, the great volume of school work was the result of extension effort directly from the Department of Agriculture of the province.

The work of the District Agent includes a great deal more than the organization and carrying on of school fair work. The Department

this year, has specialized to some extent in this juvenile work, as it is work of a definite kind and well suited to the beginning year. The other kinds of work are of a more general and casual character, and have to be met as they occur. The experience of this year, however, indicates that there is a great deal to be done in the general interests of agriculture through giving individual aid to farmers in such matters as crops, weeds, care of live-stock, marketing farm products, etc., and in the promoting of co-operative organizations among the farmers, and it is probable that this kind of

work will be the larger part of it ultimately.

For convenience, the provincial agricultural schools and, where there were no schools, the Demonstration Farms, were the centres from which this work was carried on. The District Agents, this year, were the instructors in the schools of agriculture and the kind of work taken up was suited to the convenience of the instructors, whose teaching term finished at the end of March. The work was carried on at six centres: Claresholm, Olds, Vermilion, Sedgewick, Stony Plain and Argyle. The number of schools that took part was eighty-five in all,

explaining of the purposes and methods of work to the children of the schools. This is followed by the distribution of seeds, such as beets, carrots, turnips, parsnips, peas, potatoes and flowers, and, in a limited number of cases, eggs of pure-bred breeds of poultry are also distributed.

When the District Agent takes up his work, he establishes an office in the centre of his district, usually in a town or village. He is available at his office for consultation on certain days of the week; on other days, he is visiting the gardens of pupils of the district. He aims to visit each garden at least twice during the



PAIL-FED CALF EXHIBIT AT A SCHOOL FAIR IN ALBERTA

the number in each group varying from eight to twenty-one.

The Department of Education gave general encouragement and co-operation in the work. The schools were used to enable the District Agents to set out their aims and to give instruction to pupils, and the work of the Department of Education and that of the Department of Agriculture are complementary to each other and not over-lapping. The practical work of the Department of Education, for example, is concerned with school gardens; the work of the Department of Agriculture with home gardens. The preparatory steps consist of the

season. He carries on concurrently with this work, of course, the work of assisting the farmers themselves. This year a number of them succeeded in establishing cow-testing work among the farmers.

The school fairs were sometimes held in conjunction with the district fairs; in other cases they were held alone. The latter method is now preferred. While the school exhibit attracts a good deal of attention at the district fair, there is not the same realization of its interest, purpose and benefit among adults as there is when they make a point of visiting the school fair on its own account. At some of the separate

school fairs three hundred people were present.

The prize lists for the fairs were made up of three classes of competition. In one section were the competitions among the pupils of the same school; these included vegetables, flowers and a pen of poultry, consisting of three pullets and a cockerel, about nine or ten sections in all. The second class was open to all comers from the schools in the district group and included such things as the following: pail-fed dairy heifer of 1916, pail-fed beef heifer of 1916, pail-fed steer of 1916, halter-broken and groomed colt of 1916, sheaf of hand-selected wheat, sheaf of hand-selected oats, sheaf of hand-selected barley, peck of hand-picked, threshed wheat, peck of hand-picked, threshed oats, peck of hand-picked, threshed barley. In the girls' department, prizes were given for hand-sewn, trimmed apron, hem-stitched towel, darning, knitting, for a loaf of bread, plain cooking, tea biscuits and school lunch. Prizes were also given for standard school exhibits, such as arts and crafts, writing and map drawing. The Department was not able this year to make provision for systematic instruction for the girls. In certain schools, the lady teachers appeared to secure good results. In other cases, there was considerable variation in the quality of exhibits. The uniform excellence of the boys' exhibits, due to such

matters as selection or grading in potatoes, etc., was quite evident.

Besides prizes in these standard classes of work, there were miscellaneous competitions, consisting of best school exhibit, best boys' exhibit, best girls' exhibit, the largest number of gopher tails, the best needle work exhibit, the best cooking exhibit, the best live stock exhibit, etc.

Compared with the exhibits at the general fairs, the school exhibits were very good. There was greater uniformity of quality; the exhibits were brought out in better condition. The poultry was excellent. Only one breed was distributed in each district. At some of the fairs there were about thirty pens of poultry out. The live stock at certain fairs was excellent and the interest in it was high.

During the time that the judging was going on, sports were commonly carried out. These included races, jumping and usually a number of novelty events.

The school fairs were financed wholly by the Department of Agriculture. This year a grant of six thousand dollars was made for this purpose. While the results of this expenditure more than justify the amount in the systematic improvement secured, it is felt that the logical thing to do is to enlist local effort and local expenditure to some extent to supplement what is being done by the Department.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

RURAL school fairs have only recently been introduced in British Columbia, and as yet the organization can scarcely be said to be complete. They are held in connection with the home gardening and agricultural projects, recently initiated by the Department of

Education. They are carried on directly by the teachers and boards of school trustees and are regarded as a part of school work.

The home gardening and agricultural projects are conducted in accordance with regulations of the Department, similar to those govern-

ing school gardens. The home gardens are intended to take the place of school gardens in cases where the latter cannot be provided for. They are also advocated as supplementary individual home projects for boys and girls in the advanced classes of the public school who have already had instruction for two or more years in school gardening. The emphasis is placed on the use the teacher makes of these home projects in the teaching of rural science throughout the year, the school fair being but an incident in connection with the year's work. The school fair, how-

the carrying on of these home projects in rural science as for the maintenance of school gardens, and are allowed to spend up to one-half the amount of the departmental grant in the awarding of suitable prizes for the pupils taking part in the contest. In no case do School Boards receive more than the amount actually expended. On the other hand, they are expected to supplement the amounts allowed by the Department. The teachers who are in immediate charge of the work receive the same bonus grants as do those who conduct school gardening.



FIRST PRIZE FLOCK OF WHITE WYANDOTTE CHICKENS, DENMAN ISLAND, B.C.,
SCHOOL FAIR

ever, helps to stimulate and sustain the interest of the pupils throughout the year, and also brings the parents and the public generally more into touch with the work of the schools.

The question of supplying seeds, settings of eggs, etc., to the pupils taking part is left entirely in the hands of the teachers and school trustees, the only restriction being that not less than six pupils shall take part in the same project, so as to make possible a competition in that project. School Boards are allowed the same financial assistance towards

They receive and discuss the pupils' weekly reports, and furnish two official reports to the Department each year. These reports are in part the result of two visits made by the teachers to the homes where these rural science projects are being carried on, one visit in the month of June and one in September. The teachers are supplied with score cards, which they use in reporting on the home gardens.

Home gardening and related work has been carried on in connection with twenty-five schools this year, as

a beginning, the number of pupils taking part being reported as three hundred and seventy-six. The final reports for the year have not all come in, but it is safe to say that most of these schools have made exhibits, either at a regular school fair or in connection with the annual fair held by the agricultural society. Some School Boards prefer to have the school children's exhibits included in the regular agricultural fair, as they consider that a larger number of people will see the school exhibits and particularly those people who would not come to the school fair when held by itself. Certainly, it is this disinterested class that needs first attention.

SCHOOL GARDEN COMPETITIONS

It is also worthy of note just here that competitions are also being instituted amongst school gardens in various parts of the province. Possibly by another year these competitions will be made to include all of the gardens. This year and last year the various schools in the rural municipality of Chilliwack were organized in a school garden competition. A shield was offered by Mr. J. C. Readey, B.S.A., District Supervisor of Agricultural Instruction, to be competed for by the various schools having school gardens in the municipality, the shield to become the property of the first school to win in the competition three times in succession. It would be difficult to find finer school garden exhibits anywhere than those which engaged the attention

of the judges at the Chilliwack exhibition this year, and the interest manifested by the large crowd of people present afforded ample evidence of the popularity of the competition, as well as of the school garden work itself. In most cases the exhibits included, in addition to garden vegetables and flowers, samples of the children's work in writing, drawing and nature collections. From some schools where manual training and domestic science are taught, very creditable exhibits were put in, showing some of the results of the children's work along these lines.

In connection with the boys' and girls' competitions, which are conducted throughout the province by the Department of Agriculture, exhibits are made in four classes, viz.: potatoes, corn, pigs and poultry. The potatoes and corn are judged at the provincial seed fairs, of which there are two in the province, whilst the pigs and poultry are exhibited at the nearest agricultural fair. Cash prizes are given to the local winners and sweepstake prizes to provincial winners. These prizes are allotted on the basis of four scores: (1) a home or field score; (2) the yield or finished product; (3) a financial report; (4) an essay based on the work involved in the competition. These boys' and girls' clubs have been organized mostly under the supervision of local farmers' and women's institutes, although, in places where these organizations do not exhibit, arrangements have been made to have the club work carried on.

MANITOBA

SCHOOL INSPECTORS' CONFERENCE

A conference of the Rural School Inspectors of Manitoba was held in Winnipeg for four days during the last week of November. Miss Mable Carney of St. Paul, Supervisor of the High School Teacher Training classes of Minnesota, attended the conference and delivered addresses at each session.

Almost every branch of the public school inspectors' work was dealt with, such as: organization, administration, school-room inspection, criticisms, curriculum time-tables and community work. The men all gained great inspiration by the points brought out in the addresses and discussions of these topics.

BRITISH COLUMBIA

VICTORIA HOME PRODUCTS EXHIBITION

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THE Home Products Fair, into the making of which the manufacturers, agriculturists, horticulturists and other producers of Southern Vancouver Island threw their energies with marked enthusiasm, was opened at Victoria, B.C., on Monday, October 2nd, 1916. Two organizations were specially responsible for the inception and management of the Fair, viz., the Victoria and Island Development Association and the Victoria Manufacturers' Association. The exhibition, which lasted throughout the week commencing on the date mentioned, was a revelation to the exhibitors themselves as well as to the public.

The exhibits, which represented all manner of manufactured and soil products, were housed in the large new store recently erected by the Hudson's Bay Company and loaned for the purpose. Electric light and power were supplied free of cost by the British Columbia Electric Company. The decoration and space committee went to a great deal of pains in making the interior of the

building attractive. In addition to the various stalls and spaces occupied by the exhibits, a concert and lecture auditorium was provided and a large section on the second floor reserved for the supplying of refreshments. An orchestra was in attendance daily.

The various branches of the Red Cross Society carried on a continuous and vigorous campaign in raising funds during the fair. Booths of all kinds were run by a number of willing and capable workers, superfluities sales carried on, and evening entertainments given. Through these various endeavours the neat sum of twenty-five hundred dollars was realized. The total receipts from the fair, including the gate receipts, were in the neighbourhood of eighteen thousand dollars. Altogether, some seventy firms put in exhibits.

EDUCATIONAL ADDRESSES

Lectures and addresses were given during the week, emphasizing, on the

one hand, the need and the opportunity afforded for increased production in agricultural and manufactured products, and, on the other, the great importance of the people's patronizing home industries and buying articles of home manufacture or growth. Stress was laid on these points by Dr. S. F. Tolmie, Dominion Live Stock Commissioner for British Columbia, to whom fell the honour of officially opening the exhibition. "The great war now being carried on", said Dr. Tolmie, "is piling up a large indebtedness

to help ourselves rather than to wait for the Governments to do something for us. We should remember that our development depends largely on the energy displayed by the people who live here. Victoria and Vancouver Island will be just what the people make them, no more and no less." Addresses were given by representatives of the Consumers' League of Vancouver, which has a membership of ten thousand, also emphasizing the need of patronizing home industries, thus encouraging home production.



EXHIBIT OF FLOWERS AND VEGETABLES FROM THE SCHOOL AND HOME GARDENS OF THE CHILDREN OF VICTORIA

which will have to be met by the citizens of this country. To meet this we will have to increase our production in every possible way, and it behooves every loyal citizen to use his best efforts to encourage the consumption of the products of the home factory and farm. In these circumstances every citizen should take the deepest interest in the development of the city of Victoria and this section of the province. There should be a feeling of community interest and a desire

AGRICULTURAL EXHIBITS

An attractive exhibit was installed by the Superintendent of the Dominion Experimental Farm at Sidney, V.I., Mr. L. Stevenson. It included a combination of products grown on the farm, giving proof of the value of proper scientific principles applied in the practice of farming. The provincial Government's exhibit, which had just been returned from the Toronto exhibition, formed another attractive feature. It represented the chief resources of

the province, a good deal of space being allotted to agricultural products.

One of the most important and, judging from the interest displayed by the people, one of the most significant exhibits at the Fair was that put on by the local Seed-growers' Association, recently organized. It furnished an eloquent testimony to the fine possibilities on Vancouver Island. This

tables. The quality of the apples exhibited reflected much credit on the good management and enterprise of the growers. "It all goes to show," said one who knows, in commenting on the exhibit, "that there is scarcely any limit to the possibilities of the fruit-growing industry on Vancouver Island. All that is necessary is careful attention to the cultivation and the spraying of the trees at the hands of men



EXHIBIT OF THE GORDON HEAD FRUIT GROWERS AT THE VICTORIA HOME PRODUCTS EXHIBITION

Manual Training Exhibit from Saanich Municipality in the foreground

display contained samples of seeds of various kinds, many of which had shown one hundred per cent vitality in recent germination tests. The vegetables and flowers in this exhibit were all grown from seeds produced locally and were of most excellent quality.

The Gordon Head Fruit Growers' Co-operative Union put on an excellent display of fruit and vege-

acquainted with their requirements."

BOYS' AND GIRLS' WORK

Nor were the boys and girls of the public schools of Victoria behind time in bearing evidence to their ability to help in the work of food production. In a conspicuous place in the gallery was to be seen a well-arranged exhibit of many varieties of flowers and vegetables taken

from the children's school and home gardens. Had the teachers and pupils known about it sooner, a much more elaborate display from their gardens would have materialized, as all are enthusiastic over this department of their work.

Some other displays of school boys' work deserve mention. The boys of the Saanich Schools, under the direction of their instructor, Mr. Leonard Campbell, prepared an exhibit of such useful articles as are to be found around the ordinary farm house. It is not every boy who can draw the plans of a well-proportioned wheel-barrow and construct it in finished style, as these boys have succeeded in doing. Samples of work done by the girls of these schools in sewing and needlework also formed an interesting part of the Saanich exhibit.

RETURNED SOLDIERS' EXHIBIT

Another exhibit in the line of manual arts which attracted a good deal of attention was one prepared by a number of returned soldiers undergoing restorative treatment at

the Soldiers' Convalescent Home at Esquimalt. A number of these men are in process of re-education to enable them to take up some new line of work on receiving their discharge. Some of them are receiving instruction in woodworking, drafting and mechanical arts, and, although they had only been under instruction for a few weeks, they had succeeded in turning out a number of well-finished articles.

Several firms engaged in the preparation of confectionery and prepared food stuffs made attractive exhibits, as well as several individual growers of fruit, vegetables and nursery stock. The famous western cane fruit, the loganberry, was much advertised and its great possibilities as a revenue producer for Vancouver Island fully discussed at one of the Fair lectures.

Some of the finest exhibits noticed were those put in by local lumbering companies and wood-finishing firms, of which there are a large number on Vancouver Island. It is estimated that over twenty-five thousand people attended the Fair during the week.

Remember the principle of breeding from selection. Like begets like, and this immutable law of nature is the foundation-stone of successful agriculture. Whether you are growing a grain, root, vegetable, or fruit crop, or breeding horses, cattle, sheep, swine, or poultry, the same principle holds good—breed from selection. Away with inferior seed and scrub sires. The continued use of them will prove your undoing.—*Wm. E. Scott, Deputy Minister of Agriculture, British Columbia.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

ACTS RELATING TO AGRICULTURE

Herewith is presented a list of the Acts relating directly to agriculture administered by the Federal and Provincial Governments. From time to time, as occasion arises, there are also Orders-in-Council adopted which, for the terms required, have the same effect, the same weight, and call for the same recognition as the Acts. The Acts listed below do not comprise all the legislation administered by the various Departments of Agriculture, but only those considered as directly affecting the industry itself, while the list contains Acts, which, although administered by other Departments than those of Agriculture, yet have an immediate bearing on the national industry. The Departments, too, are not all uniform in the matters coming within their jurisdiction. Particularly is this the case as regards educational and financial matters and public works, which, while bearing upon the farm and the farmer, are yet of more intimate concern to the sections of the Governments, having such lines in charge, than to the Departments of Agriculture.

THE DOMINION

- The Department of Agriculture Act, R. S., page 1,263.
- The Experimental Farm Stations Act, R. S., page 1,327.
- The Animals Contagious Diseases Act, R. S., page 1,335, amended S. 1909, page 79; S. 1913, page 139.
- The Inspection and Sale Act, Part VIII Dairy Products, Part IX Fruit, R. S., page 1,555. Part VIII amended S. 1908, page 369; Part IX amended S. 1907, page 251, S. 1908, page 369, S. 1913, page 307.
- The Meat and Canned Foods Act, S. 1907, page 271. Amended S. 1908, page 435; S. 1910, page 367.
- The Cold Storage Act, S. 1907, page 117. Amended S. 1909, page 103.
- The Destructive Insect and Pest Act, S. 1910, page 247.
- The Milk Test Act, S. 1910, page 431.
- The Seed Control Act, S. 1911, page 219. Amended S. 1910, page 421.
- The Live Stock Pedigree Act, S. 1912, page 265.
- The Agricultural Instruction Act, S. 1913, page 135.
- The Dairy Industry Act, S. 1914, page 69.
- The Cold Storage Warehouse Act, S. 1914, page 163.

THE PROVINCES

PRINCE EDWARD ISLAND

- For the encouragement of Agriculture, amended 3 E. VII, c. 4; 6 E. VII, c. 5; 2 G. V, c. 18 and 19.
 Respecting Domestic Animals, 51 V. c. 4; amended 3 E. VII, c. 2.
 To prevent the spread of the Black-knot on Plum and Cherry Trees, 58 V.
 Respecting Dogs, 44 V.
 To prevent the spread of Noxious Weeds, 9 E. VII, c. 2.
 Respecting the appropriation of certain lands for an Experimental Farm, 10 E. VII, c. 4.
 Establishing the Prince Edward Island Farmers' Central Institute, 1 G. V, c. 11.
 For the encouragement of Horse Breeding in Prince Edward Island, 2 G. V, c. 22.
 Incorporating The Prince Edward Island Sheep Breeders' Association, 4 G. V, c. 21.
 Incorporating The Prince Edward Island Co-operative Egg and Poultry Association, 4 G. V, c. 22; amended 5 G. V, c. 22.
 Incorporating The Prince Edward Island Co-operative Seed Association, 5 G. V, c. 23.
 The Drainage Act, 1916, 6 G. V, c. 7.
 Incorporating the Prince Edward Island Dairy Association, 6 G. V, c. 16.

NOVA SCOTIA

- The Encouragement of Agriculture, R. S., 1900, c. 56. Amended 3 E. VII, c. 12; 6 E. VII, c. 11; 8 E. VII, c. 3.
 The Provincial Exhibition Act, R. S., 1900, c. 57. Amended 3 E. VII, c. 31; 6 E. VII, c. 19 & 20; 4 G. V, c. 24.
 The Encouragement of Agricultural and Technical Education, R. S., 1900, c. 58. Amended 1 E. VII, c. 18.
 The Nova Scotia Farmers' Association, R. S., 1900, c. 59. Amended 3 E. VII, c. 34; 6 E. VII, c. 48; 5 G. V, c. 19.
 The Registration of Horses for Breeding Purposes, R. S., 1900, c. 60.
 The Protection of Sheep, R. S., 1900, c. 61. Amended 3 & 4 E. VII, c. 38; 8 E. VII, c. 63.
 The Protection of the Growth of Cranberries, R. S., 1900, c. 62. Amended 1 E. VII, c. 52; 3 E. VII, c. 65; 5 E. VII, c. 42; 8 E. VII, c. 28.
 The Prevention of Diseases Affecting Fruit Trees, R. S., 1900, c. 63.
 The Prevention of the Spread of the San Jose Scale, R. S., 1900, c. 64.
 Cold Storage, R. S., 1900, c. 65.
 The Improvement of Dyked and Marsh Lands, R. S., 1900, c. 66. Amended 8 E. VII, c. 51; 1 G. V, c. 18; 5 G. V, c. 20.
 Ditches and Water Courses, R. S., 1900, c. 67.
 Common Fields, R. S., 1900, c. 68.
 To further encourage Dairying in the Province of Nova Scotia, 1 E. VII, c. 6.
 Respecting the Nova Scotia Herd Book, 1 E. VII, c. 7.
 To encourage Horticulture, 1 E. VII, c. 8.
 To enable Municipalities to assist in supplying Polling Districts with Seed Grain, 5 E. VII, c. 5.
 To facilitate the Incorporation of Farmers' Fruit, Produce, and Warehouse Associations, 8 E. VII, c. 33. Amended 10 E. VII, c. 40; 2 G. V, c. 22; 3 G. V, c. 45 & 63; 4 G. V, c. 47; 6 & 7 G. V, c. 28.
 To Prevent the Introduction and Spread of Insects, Pests and Plant Diseases Destructive to Vegetation, 1 G. V, c. 3. Amended 4 G. V, c. 56; 5 G. V, c. 32.
 For the Encouragement of Settlement on Farm Lands, 2 G. V, c. 10. Amended 3 G. V, c. 56; 5 G. V, c. 35.
 For the Encouragement of Horse Breeding in Nova Scotia, 2 G. V, c. 17.
 To consolidate the Acts for the encouragement of Agriculture, 2 G. V, c. 20. Amended 3 G. V, c. 62; 4 G. V, c. 64; 5 G. V, c. 39.
 To assist the purchase of Power Ditching Machines, 2 G. V, c. 21.
 To authorize the expenditure of Dominion Aid for Agriculture, 2 G. V, c. 23.
 Respecting the Provincial Exhibition Commission, 3 G. V, c. 7.
 To incorporate the Nova Scotia Veterinary Association. 3 G. V, c. 8.
 In relation to the Inspection and Enrolment of Stallions. 3 G. V, c. 9. Amended 4 G. V, c. 71.
 To encourage Poultry Breeding by the Formation of the Nova Scotia Poultry Association. 3 G. V, c. 10.
 To provide for carrying on Agricultural Demonstration Work. 3 G. V, c. 11.
 For the appointment of a Superintendent of Dairying. 3 G. V, c. 12.
 For the encouragement of Seed Growing. 3 G. V, c. 13.
 For the encouragement of Dairying. 3 G. V, c. 3. Amended 6-7 G. V, c. 29.

To encourage the incorporation of Farmers' Co-operative Societies. 4 G. V, c. 4. Amended 5 G. V, c. 41.

Respecting a Provincial Loan for the erection of a Science Building on the grounds of the Agricultural College, Truro, and for Fire Protection. 4 G. V, c. 5. Amended 5 G. V, c. 42.

To encourage the growing of wheat and other cereals. 5 G. V, c. 12.

For the Prevention and Treatment of Contagious Diseases among Bees. 6-7 G. V, c. 6.

NEW BRUNSWICK

Respecting the Encouragement of Agriculture. 51 V., c. 3; C. S. c. 37; Extended 8 E. VII, c. 14. Amended 5 G. V., c. 21.

Respecting the Incorporation of Cheese and Butter Manufacturing Associations. 53 V., c. 48; C. S. c. 38.

Respecting Encouragement to Dairying. 53 V., c. 10; C. S., c. 39.

Respecting the Inspection of Butter and Cheese intended for Export. 58 V., c. 9; C. S. c. 40.

Respecting the Encouragement of the Use of Mussel Mud as a Fertilizer. 2 E. VII, c. 12; C. S. c. 41; Amended 9 E. VII, c. 18.

Respecting Aid Towards Providing Cold Storage for Agricultural and Other Products. 1 E. VII, c. 11; C. S., c. 42. Amended 7 E. VII, c. 34; 5 G. V., c. 17.

Respecting Grants in Aid of Provincial and County Agricultural Exhibitions. 62 V., c. 13; C. S., c. 43.

Respecting the Farmers' and Dairymen's Association of New Brunswick. 56 V., c. 66; C. S., c. 44.

Respecting Farmers' Institutes. 1 E. VII, c. 13; C. S., c. 45.

Respecting Aid to Establish an Agricultural School for the Maritime Provinces. 1 E. VII, c. 18; C. S., c. 47.

Respecting the Preservation of the Records of Horse Pedigrees. 43 V., c. 20; C. S., c. 48. Relating to Cattle running at Large. 4 E. VII, c. 20.

To regulate the Inspection of Dairies, and the Manufacture, Inspection and Export of Dairy Produce. 4 E. VII, c. 24. Amended 7 E. VII, c. 39; 8 E. VII, c. 23.

To extend the exemption of Butter and Cheese Factories from Taxation. 6 E. VII, c. 29.

To provide for the Importation of Horses and Sheep. 7 E. VII, c. 17.

Respecting the Protection of Sheep from Dogs. 7 E. VII, c. 20; Amended 9 E. VII, c. 27.

To provide for certain Improvements to the Dairy School Building at Sussex. 7 E. VII, c. 44.

To provide for an Agricultural Commission. 8 E. VII, c. 15.

To encourage the Settlement of Farm Lands. 2 G. V., c. 28.

Relating to The Agricultural Aid Act of Canada. 2 G. V., c. 34.

To establish Agricultural Schools in New Brunswick. 3 G. V., c. 19.

To Prevent the Introduction and Spread of Insects, Pests and Plant Diseases, Destructive to Vegetation. 3 G. V., c. 24.

Relating to The Agricultural Instruction Act of Canada. 4 G. V., c. 20.

Respecting Tuberculosis in Cattle. 4 G. V., c. 21.

To provide for the Inspection and Registration of Stallions. 5 G. V., c. 18.

For the suppression of Infectious and Contagious Diseases among Bees and for the Protection of Bees. 5 G. V., c. 19. Amended 6 G. V., c. 43.

To provide for assistance to Wheat Mills. 5 G. V., c. 20.

QUEBEC

The Minister of Agriculture, his duties; art. 1748 to 1751, R. S., 1909.

Officers of the Department of Agriculture; art. 1752, 1753, 1754 and 1760, R. S., 1909.

Council of Agriculture; art. 1755 to 1777, R. S., 1909.

Agricultural Merit Competitions, art. 1778 to 1791, R. S., 1909.

Agricultural Societies, art. 1792 to 1858, R. S., 1909. Amended 9 E. VII, c. 28; 1 G. V, c. 13; 2 G. V, c. 19; 4 G. V, c. 14.

Farmer's Clubs, art. 1859 to 1912, R. S., 1909. Amended 9 E. VII, c. 28; 1 G. V, c. 19; 4 G. V, c. 14 and 15; 5 G. V, c. 30.

Breeders' Syndicate, art. 1913 to 1943, R. S., 1909.

Horticultural Societies, art. 1944 to 1949, R. S., 1909.

Pomological Societies, art. 1950 to 1957, R. S., 1909.

Dairymen's Association of the Province of Quebec, art. 1958 to 1970, R. S., 1909. Amended 5 G. V, c. 31.

Agricultural Co-operative Societies, art. 1971 to 1994, R. S., 1909. Amended 9 E. VII, c. 21; 1 G. V., c. 14; 1 G. V. c. 20 2 G. V, c. 20; 4 G. V, c. 16; 5 G. V, c. 32 and 33.

Dairying and Agricultural Societies, art. 1995 to 2004, R. S., 1909. Amended 3 G. V, c. 20.
 Duties of the Officers of some Institutions in connection with the Department of Agriculture, art. 2023, R. S., 1909.
 Inspection of Creameries and Cheese factories, art. 2024 to 2031, R. S., 1909.
 Bees and Contagious Diseases, art. 2032 to 2041b, R. S., 1909. Amended 1 G. V, c. 22; 2 G. V, c. 41.
 Butter and Cheese Making Associations, art. 7175 to 7185, R. S., 1909.
 Adulterated Milk, penalties for the sale of adulterated Milk to creameries and cheese factories, art. 7182 to 7185, R. S., 1909.
 Associations of patrons of cheese and butter making factories, art. 7186 to 7214, R. S., 1909.
 Butter and Cheese Boards, art. 7215 to 7219, R. S., 1909.
 Weeds, art. 7353 to 7356, R. S., 1909. Amended 1 G. V., c. 47.
 Montreal Agricultural and Horticultural Societies, art. 1682, R. S., 1888.
 Manufacturing of Dairy Products, art. 2031a to 2031g., R. S., 1909. Amended 1 G. V, c. 16; 5 G. V, c. 31.
 Properties of agricultural and horticultural associations exempt from school and municipal taxes, art. 5927, R. S., 1909.
 Creation of an indemnity fund to indemnify sheep breeders whose sheep have suffered injuries, art. 5956c to 5956e, R. S., 1909. Amended 6 G. V, c. 30.
 Protection of Plants from insect pests and fungous diseases, 4 G. V, c. 17.
 Respecting co-operative agricultural associations. 1 G. V, c. 15.
 The Veterinary Surgeons' Act of the Province of Quebec: 1 G. V, c. 32.
 Respecting the Department of Agriculture and to establish the Roads Department. 2 G. V, c. 17. Amended 3 G. V, c. 21.
 Respecting the encouragement of agriculture, 2 G. V, c. 18.
 Respecting certain grants to agricultural and other associations. 5 G. V, c. 29.

ONTARIO

The Department of Agriculture Act, 10 E. VII, c. 17., R. S.
 The Agricultural Associations Act, 10 E. VII, c. 18, R. S.
 The Agricultural Societies Act, 10 E. VII, c. 19, R. S.
 The Horticultural Societies Act, 10 E. VII, c. 20, R. S.
 The Provincial Aid to Drainage Act, 1 G. V, c. 12, R. S. Amended 6 G. V, c. 23.
 The Swarms of Bees Act, 10 E. VII, c. 48, R. S.
 The Municipal Drainage Act, 10 E. VII, c. 90. R. S. Amended 4 G. V, c. 18; 6 G. V, c. 22 and 43.
 The Milk Act, 1 G. V, c. 69, R. S.
 The Milk, Cheese and Butter Act, 3-4 G. V, c. 59. R. S.
 The Dairy Products Act, 3-4 G. V, c. 58, R. S. Amended 6 G. V, c. 52.
 The Fruit Sales Act, 4 G. V, c. 225, R. S.
 The Entry of Horses at Exhibitions Act, 4 G. V, c. 226, R. S.
 The Threshing Machines Act, 4 G. V, c. 238, R. S.
 The Dog Tax and Sheep Protection Act, 2 G. V, c. 65, R. S. Amended 6 G. V, c. 56.
 The Pounds Act, 2 G. V, c. 66, R. S.
 The Ontario Stallion Act, 2 G. V, c. 67, R. S. Amended 4 G. V, c. 44.
 The Steam Threshing Engines Act, 4 G. V, c. 251, R. S.
 The Cheese and Butter Exchanges Act, 4 G. V, c. 191, R. S.
 The Noxious Weeds Act, 2 G. V, c. 68, R. S. Amended 6 G. V, c. 59.
 The Fruit Pest Act, R. S., 2 G. V, c. 69.
 The Barberry Shrub Act, 2 G. V, c. 70, R. S.
 The Ginseng Act, 2 G. V, c. 71, R. S.
 The Bee Protection Act, 2 G. V, c. 72, R. S.
 The Foul Brood Act, 2 G. V, c. 73, R. S.
 The Line Fences Act, 3-4 G. V, c. 67, R. S.
 The Ditches and Watercourses Act, 2 G. V, c. 74, R. S.
 The Protection of Birds Act, 4 G. V, c. 263, R. S.
 The Agricultural College Act, 3-4 G. V, c. 76, R. S.
 The Veterinary College Act, 9 E. VII, c. 96, R. S.
 The Industrial Farms Act, 2 G. V, c. 78, R. S.
 Respecting Advertising Agricultural Resources by Counties. 4 G. V, c. 19.
 Respecting District Representatives of The Department of Agriculture. 4 G. V, c. 20.
 Respecting the Protection of Pure Bred Cattle. 4 G. V, c. 43.
 For the creation of a Provincial Committee to secure the organization of the resources of Ontario for efficient co-operation with the Federal authorities in the prosecution of the war, and the maintenance of the Agricultural and Industrial production of the Province. 6 G. V, c. 4.

MANITOBA

The Agricultural College Act, R. S., 1913, c. 1. Amended 6 G. V, c. 1 and 2.
 The Agricultural Societies Act, R. S. 1913, c. 2. Amended 4 G. V, c. 2.
 Respecting the Encouragement of Agriculture, R. S., 1913, c. 3.
 The Agriculture and Immigration Act, R. S., 1913, c. 4.
 The Animals Act, R. S., 1913, c. 7.
 The Animals' Diseases Act, R. S., 1913, c. 8.
 The Cattle Brand Act, R. S., 1913, c. 25.
 The Dairy Act, R. S., 1913, c. 49. Amended 6 G. V, c. 29.
 The Dairy Association Act, R. S., 1913, c. 50.
 The Dairy Factories Incorporation Act, R. S., 1913, c. 51.
 The Land Drainage Act, R. S., 1913, c. 56.
 The Horse Breeders' Act, R. S., 1913, c. 86. Amended 5 G. V, c. 32.
 Respecting the Live Stock Industry, R. S., 1913, c. 118.
 The Noxious Weeds' Act, R. S., 1913, c. 145. Amended 4 G. V, c. 76; 6 G. V, c. 80.
 The Seed Grain Act, R. S., 1913, c. 178.
 The Stray Animals Act, R. S., 1913, c. 186.
 The Threshers' Lien Act, R. S., 1913, c. 197. Amended 4 G. V, c. 123.
 The Veterinary Association Act, R. S., 1913, c. 202.
 Respecting Dairies, Creameries and Cheese Factories, 5 G. V, c. 14.
 Respecting Grain Seed in Unorganized Districts, 5 G. V, c. 72.
 To make further Provisions for Distribution of Grain, 5 G. V, c. 71.
 To Protect Horse Breeders in the Province of Manitoba, 6 G. V, c. 56.
 Respecting Industrial Farm, 6 G. V, c. 57.

SASKATCHEWAN

The Department of Agriculture Act, 1906, c. 9, R. S., 1909.
 The Hail Insurance Act, 1908-9, c. 12, R. S.
 The Agricultural Societies Act, 1909, c. 31, R. S.
 The Stock Inspection Act, 1909, c. 19, R. S.
 For the Protection of Sheep and other Animals from Dogs. C. O., 1898, c. 82, R. S. 1909.
 Respecting Stock Injured by Railway Trains, C. O., 1898, c. 83, R. S. 1909.
 The Useful Birds Act, 1902, c. 11, R. S., 1909.
 Respecting Threshers' Liens, 1908, c. 30, R. S., 1909.
 The Municipalities Seed Grain Act, 2 G. V, c. 31.
 The Horse Breeders' Act, 2 G. V, c. 35. Amended 6 G. V, c. 31.
 The Brand Act, 3 G. V, c. 38.
 The Noxious Weeds Act, 3 G. V, c. 39.
 The Municipal Hail Insurance Act, 5 G. V, c. 22.
 The Farm Implement Act, 5 G. V, c. 28. Amended 6 G. V, c. 26.
 The Stray Animals Act, 5 G. V, c. 32. Amended 6 G. V, c. 29.
 Respecting Seed Grain, Fodder and other Relief, 5 G. V, c. 33.
 The Agricultural Aids Act, 5 G. V, c. 35.
 Incorporating The Saskatchewan Grain Growers' Association, 5 G. V, c. 36.
 The Agricultural Co-operative Associations Act, 5 G. V, c. 37.
 Respecting the Manufacture of Butter and Cheese, 6 G. V, c. 32.

ALBERTA

The Agricultural Department Act, 6 E. VII, c. 8.
 Amending Chapter 80 of the Consolidated Ordinances of the North-West Territories, 1898, entitled "An Ordinance respecting Estray Animals," 6 E. VII, c. 34.
 Respecting the Encouragement of the Sugar Beet Industry, 6 E. VII, c. 37.
 The Veterinary Act, 6 E. VII, c. 57.
 The Noxious Weeds Act, 7 E. VII, c. 15.
 The Dairymen's Act, 7 E. VII, c. 16.
 The Alberta Drainage Act, 8 E. VII, c. 18.
 Respecting Seed Grain, 8 E. VII, c. 21.
 The Hail Insurance Act, 2-3 G. V, c. 7.
 To amend the Herd Ordinance, being Chapter 81 of the Consolidated Ordinances, 2-3 G. V, c. 14.
 The Brand Act, 4 G. V, c. 24. Amended 5 G. V, c. 23.
 The Threshers' Lien Act, 4 G. V, c. 26.
 For Restraining Dangerous and Mischievous Animals, 4 G. V, c. 27.
 The Private Ditches Act, 4 G. V, c. 6.

The Agricultural Schools Act, 4 G. V, c. 11.
 The Co-operative Associations Act, 4 G. V, c. 12.
 The Farm Machinery Act, 4 G. V, c. 15.
 The Thresher Employees' Lien Act, 4 G. V, c. 17.
 The Stock Inspection Act, 5 G. V, c. 11. Amended 6 G. V, c. 29.
 The Sheep Trailing Act, 5 G. V, c. 12.
 Respecting Seed Grain, Fodder and other Relief, 5 G. V, c. 14.
 The Municipal Co-operative Hail Insurance Act, 5 G. V, c. 18. Amended 6 G. V, c. 19.
 The Women's Institute Act, 6 G. V, c. 21.
 The Drainage Act, 6 G. V, c. 24.

BRITISH COLUMBIA

The Department of Agriculture Act, R. S., 1911. Amended 6 G. V, c. 3.
 The Agricultural and Trade Credit Societies Act, R. S., 1911.
 The Animals Act, R. S., 1911. Amended 5 G. V, c. 6.
 The Foul Brood Bees Act, R. S., 1911.
 The Cattle Farming Act, R. S., 1911.
 The Cattle Lien Act, R. S., 1911.
 The Cattle-marking Act, R. S., 1911.
 The Cattle-ranges Act, R. S., 1911.
 The Contagious Diseases Animals Act, R. S., 1911. Amended 2 G. V, c. 4.
 The Ditches and Water-courses Act, R. S., 1911.
 The Drainage, Dyking and Irrigation Act, R. S., 1911. Amended 2 G. V., c. 7; 3 G. V, c. 18; 4 G. V, c. 22; 5 G. V, c. 19.
 The Line Fences Act, R. S., 1911. Amended 4 G. V, c. 28; 5 G. V, c. 26.
 The Homestead Act, R. S., 1911.
 The Island Pasturage Act, R. S., 1911.
 The Land Act, R. S., 1911.
 The Crown Lands Pasture Act, R. S., 1911.
 The Agricultural Associations Act, R. S., 1911. Amended 3 G. V, c. 2; 4 G. V, c. 1.
 The Milk Fraud Act, R. S., 1911.
 The Stock-Breeders Protection Act, R. S., 1911.
 The Trespass Act, R. S. 1911. Amended 4 G. V, c. 77; 6 G. V, c. 66.
 The Veterinary Act, R. S. 1911. Amended 2 G. V, c. 48.
 The Noxious Weeds Act, R. S. 1911. Amended 4 G. V, c. 82; 5 G. V, c. 66.
 The Pound District Act, 2 G. V, c. 1. Amended 4 G. V, c. 2; 5 G. V, c. 7.
 The Milk Act, 3 G. V, c. 43. Amended 4 G. V, c. 49.
 The Brand Act, 4 G. V, c. 9.
 The Agricultural Act, 1915, 5 G. V, c. 2
 The Dairies Regulation Act, 6 G. V, c. 16.
 The Eggs Marks Act, 6 G. V, c. 18.
 The Soldiers Homestead Act, 6 G. V, c. 59.

NOTE.— In the foregoing lists, V. stands for Victoria, meaning the reign of her late Majesty; E. for Edward; G. for George; S. for statutes; R. S. for revised statutes; c. for chapter and C. O., in the Saskatchewan and Alberta lists, for Consolidated Ordinances, or ordinances that governed before the organization of those provinces.

POTATO GROWING AND GARDENING CONTESTS

IN the counties of Russell and Carleton, Ontario, contests in the growing of potatoes were carried on by boys of from twelve to eighteen years of age. In Carleton county there was a contest in gardening and canning fruits and vegetables for girls between the ages of ten and eighteen years. This was the fourth potato contest in the county of Russell and the fifth in the county of Carleton.

The committee in charge of these contests consists of Mr. R. B. Whyte, a citizen of Ottawa who supplied the prizes; Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association; Mr. W. D. Jackson, District Representative for Carleton County, and, W. T. Macoun, Dominion Horticulturist. The rules governing the potato contest required the size of plot used to be exactly one-tenth of an acre and the competitors were required to do the work without help, except in the case of younger boys who could be assisted in the ploughing. An accurate account of the expenses and profits had to be kept, and a written report of the work of each competitor submitted. The variety grown throughout the contests in 1916 was the Green Mountain.

The exceedingly wet spring and dry summer discouraged many of those who had entered, so that a comparatively small number in each county carried their work through to the end of the season. In spite of the unfavourable season the first prize-winner in Carleton county realized the remarkable yield of 393 bushels per acre. Calculated at the price of 60 cents per bushel, which price was agreed upon when the contest was commenced, his net profit per acre was at the rate of \$165 and the cost of producing one bushel 17 cents. The second prize-winner in this county secured a yield at the rate of 190 bushels per acre at a cost of 39 cents per bushel. In Russell county the winner of the first prize harvested a yield at the rate of 420 bushels per acre. His net profit per acre at 60 cents a bushel, was \$174. His potatoes were grown at a cost of 15 cents per bushel. The second prize-winner secured a yield at the rate of 350 bushels per acre at a cost of 30 cents per bushel. His net profit per acre was at the rate of \$99.70.

The average yield per acre of the prize-winners in Carleton county was at the rate of 268.2 bushels, and in Russell county at the rate of 319.1 bushels. The average yield per acre obtained by the prize-winners

in the two counties was at the rate of 293.6 bushels, which was approximately five times the average yield of potatoes in the province in 1916. The average net profit for all the competitors in the two counties, on the basis of 60 cents per bushel, was \$79.27. The average cost of producing one bushel was 42.8 cents. Calculated at the current market prices prevailing profits obtained were more than double those credited in this report, and at the prices of seed potatoes it was still higher.

GARDEN AND CANNING COMPETITION

This was the second annual competition in gardening and canning fruits and vegetables for girls carried on in the county of Carleton. The unfavourable season reduced the thirty competitors who entered to ten that completed their work.

Each competitor was required to take complete charge of one-twentieth of an acre, growing as many kinds of vegetables and small fruits as possible, and to can, as far as possible for winter use, the products of their plots. It was further required that the canned products be displayed at the county fair. This competition was linked up with the schools of the county, the school inspectors being members of the committee in charge.

The winner of the first prize in this competition grew the following crops: raspberries, strawberries, corn, cauliflower, squash, pumpkins, tomatoes, peas, beets, carrots, parsnips, cabbage, parsley, cucumbers, rhubarb, musk melons, water melons, beans, lettuce and peppers. This competitor's canned exhibits included most of these crops and in some cases in several forms. The second prize-winner grew the following crops: tomatoes, onions, lettuce, parsley, radish, sage, summer savoury, peppers, peas, carrots, cabbage, beets, cauliflower, beans, parsnip, squash, corn, pumpkins, cucumbers, water melons, raspberries and strawberries. The scores of the ten competitors ranged from 261 to 161½ points. Prizes totalling \$100 were distributed among the winners according to the points won. Each competitor was supplied with forty raspberry plants of the Herbert variety.

These contests were brought to a conclusion by a public meeting convened in the city of Ottawa for the presentation of the prizes. The prize-winners were addressed by Mr. Whyte, the Secretary, and other public men.

ASSOCIATIONS AND SOCIETIES

The annual show of the Winnipeg Poultry Association will be held in the Market Building, Winnipeg, from February 13th to 16th, 1917.

The annual meeting of the Ontario Vegetable Growers' Association will be held in Toronto, February 8th. Secretary, J. Lockie Wilson, Department of Agriculture, Toronto.

The annual meeting of the Ontario Ploughmen's Association will be held in Toronto, February 8th. Secretary, J. Lockie Wilson.

The annual meeting of the Canadian Brown Swiss Association will be held at Ayer's Cliff, Quebec, on January 16th. Secretary, Ralph H. Libby, Stanstead, Que.

The annual convention of the Ontario Association of Fairs and Exhibitions will be held in Toronto on February 6th and 7th. Secretary, J. Lockie Wilson, Department of Agriculture, Toronto.

The annual meeting of the co-operative Maple Sugar and Syrup Association of the province of Quebec will be held at Waterloo, Quebec, on January 23rd and 24th, 1917. Secretary Joseph H. Lefebvre, Waterloo, Que.

The annual meeting of the Central Canada Veterinary Association will be held in Ottawa, during the Eastern Ontario Winter Fair, the dates for which are January 16th to 19th, 1917. The Secretary of the Association is H. S. Sparks, V.S., Ottawa.

The Twelfth Provincial Dairy Convention for the province of Alberta will be held at Calgary from January 31st to February 2nd, 1917. The Dairy Commissioner for the province under whose supervision the conference is being held is C. Marker, Calgary, Alta.

At a recent executive meeting of the Saskatchewan Cattle and Horse Breeders' Associations, it was decided to have sales of both classes of pure-bred stock in Regina and in Saskatoon. The dates of the Regina sale are March 14th and 15th; Saskatoon, March 21st and 22nd.

The annual meeting of the Nova Scotia Fruit Growers' Association, organized in 1863, will be held at Lawrencetown, Annapolis county, January 16th, 17th and 18th, 1917. This is a three day-convention of all the fruit interests in the province. Secretary, Manning Ells, Port Williams, N.S.

At recent sales of pure-bred sheep and swine at Regina and Saskatoon 160 sheep sold for \$4,453, an average per head of \$27.83 and 21 swine for \$531, an average of \$25.28. At Regina, 27 mature Shropshire rams averaged \$39 a piece and at Saskatoon, 15 averaged \$30.50. Oxfords and Cheviots were next in order of demand.

At the recent convention of the Western Live Stock Union the following officers were elected: President, Dr. J. G. Rutherford, C.M.G., head of the Live Stock Department of the C.P.R. department of natural resources, Calgary; secretary-treasurer, E. L. Richardson, Calgary; provincial vice-presidents, Andrew Graham, Pomeroy, Manitoba; J. L. Walters, Clive, Alberta; F. H. Auld, Deputy Minister of Agriculture for Saskatchewan, Regina; Dr. S. F. Tolmie, Veterinary Inspector for British Columbia, Victoria, B.C.

The following societies will hold their annual meetings during Farmers' Week in Winnipeg, from February 13th to 16th:—

The Manitoba Agricultural Societies, February 13th, 14th and 15th.

The Home Economics Society, February 13th, 14th and 15th.

The Canadian Seed Growers' Association, February 13th.

The Bee-Keepers' Association, February 13th and 14th.

The Horticultural and Forestry Association, February 15th and 16th.

The Dairy Association, February 15th and 16th.

THE NEW BRUNSWICK AGRICULTURAL SOCIETIES

The annual meeting of the New Brunswick Agricultural Societies United, was held at St. John, N.B., on November 23rd. Addresses were delivered by Mr. Reid of St. John, N.B., H. B. Durost, Honourable F. B. Smith, Acting Minister of Agriculture, and J. B. Daggett, Secretary for Agriculture. The officers elected for the

year were: President—B. N. Shaw, Hartland; vice-president, Roy McCain, Fredericton; secretary, Stanley Wilson, Rolling Dam; directors, W. B. Gilman, Fredericton; Stanley Wilson, Rolling Dam; M. A. MacLeod, Sussex; W. H. Moore, Scotch Lake; R. J. Huggard, Norton.

MOCK AUCTION SALES

During the months of January and February the District Representatives in the province of Ontario will hold short courses in agricultural instruction. These courses will be open to members of Junior Farmers' Associations and other young men in the respective districts. In the live stock courses the students will be taught not only to breed, care for and judge live stock, but a new feature will be introduced to train them to put a commercial value on

farm animals. This feature will consist of mock auction sales. The classes will be taken to farmers' yards where the entire stock will be auctioned off to the students as though they were actually buying the animals. The stock will all be appraised by practical men. Each student will be required to bid on each animal. Those that come nearest the appraised value will be credited with corresponding points and awards.

THE WESTERN ONTARIO SEED GROWERS' ASSOCIATION

The annual meeting of the Western Ontario Seed Growers' Association was held in the City Hall, Guelph, on December 6th, 1916. Many addresses on important topics relating to seed were delivered by Dr. C. A. Zavitz and others.

The election of officers resulted as follows:—Hon. President, G. H. Clark, Seed Commissioner, Ottawa; hon. vice-president, Dr. C. A. Zavitz, O.A.C.; president, A. McKenney, Amherstburg; vice-president, A. S. Maynard, Chatham;

secretary-treasurer, R. W. Wade, Department of Agriculture, Toronto; assistant secretary, R. E. Mortimer, Toronto; directors: Wm. Barrie, Galt; L. D. Hankinson, Aylmer; A. McKenney, Amherstburg; J. O. Duke, Ruthven; R. W. Knister, Comber; Prof. W. J. Squirrell, O.A.C., Guelph; A. McMeans, Brantford; Wm. Naismith, Falkenburg; Prof. J. W. Crow, O.A.C., Guelph, and A. S. Maynard, Chatham.

THE ONTARIO BEEKEEPERS' ASSOCIATION

The annual convention of the Ontario Beekeepers' Association was held in Toronto on December 12th, 13th and 14th, 1916. The attendance was large at every session. Many prominent beekeepers, from both Canada and the United States were present, including Mr. C. P. Dadant, Editor of the *American Bee Journal*, Hamilton, Ill., and principal outside speaker at the convention; Mr. E. R. Root, member of the A. I. Root Company, Medino, Ohio; Mr. Achord, Fitzpatrick, Ala.

A resolution was passed expressing the deep sense of loss with which the Association views the death of the late Honourable Jas. S. Duff, Minister of Agriculture, the late Dr. C. C. James, Federal Commissioner of Agriculture, who as Deputy Minister of Agriculture of Ontario was one of the earliest official friends of the Ontario Beekeepers' Association; and the members

who have paid the supreme sacrifice while serving on foreign fields for our King and Country.

A communication was received from the British Columbia Beekeepers' Association suggesting the formation of a Federal Beekeepers' Association, to include the provinces already organized:—New Brunswick, Quebec, Ontario, Manitoba and British Columbia, and any others that might organize later. The directors expressed interest in the proposed plan but no action was taken.

The following officers were elected:—President, F. W. Krouse, Guelph; 1st vice-president, Jas. Armstrong, Selkirk, Ont.; 2nd vice-president, W. W. Webster, Little Britain, Ont.; secretary-treasurer, Morley Pettit, Guelph, Ont. Directors: R. E. L. Harkness, Iroquois, Ont.; A. McTavish, Carleton Place, Ont.; M. B. Holmes,

Athens, Ont.; John Chisholme, Rt. 4, Belleville, Ont.; W. W. Webster, Little Britain, Ont.; H. G. Sibbald, Toronto, Ont.; F. W. Krouse, Guelph, Ont.; James Armstrong, Rt. 1, Selkirk, Ont.; John

Newton, Thamesford, Ont.; Jacob Haberer Zuroch, Ont.; C. E. Chrysler, Chatham, Ont.; R. J. Houghton, Newton Robinson, Ont.; Morley Pettit, Ontario Agricultural College, Guelph.

THE POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

THE annual meeting of the Pomological and Fruit Growing Society of the province of Quebec was held at Macdonald College, December 5th and 6th. Professor W. Lochhead, President of the society conducted the sessions. In his presidential address, Mr. Lochhead pointed out that according to the latest census one and one-quarter million apple trees in the province of Quebec, are producing annually about one and one-half million barrels of apples. In comparison with this, he showed that one of the demonstration orchards of more than one hundred trees, that had been scientifically conducted, had in 1916, produced 10 barrels per tree. He said that unless something were done to improve the apple-growing industry by demonstration orchards, improvement of transportation and marketing facilities, the industry in the province of Quebec would drop far behind the position it once enjoyed.

The programme included the following addresses:—

"Shall We Continue to Spray," by Rev. Fr. Leopold, Oka Agricultural Institute; "Pollination of MacIntosh and Fameuse," by Mr. A. C. Gorham, Macdonald College; "Benefits of the Inspection to Our Fruit Growers," by C. W. Baxter, Department of Agriculture, Ottawa; "Keeping Qualities of Varieties of Apples," by Professor W. T. Macoun, Dominion Horticulturist; "Some New Raspberries," by C. P. Newman, Machine Locks; "Success—The Reward of Good Care in Fruit Growing," by J. C. Chapais, St. Denis (En bas), Que.; "Insect Notes for 1916," by C. E. Petch, Department of Agriculture, Ottawa; "Small Fruits for Quebec," by Prof. T. G. Bunting, Macdonald College; "The Apple Industry in 1916," by Donald Johnson, Dominion Fruit Commissioner.

The following officers were elected:

President: Prof. W. Lochhead, Macdonald College; vice-president: T. A. Raymond, St-Valier; secretary-treasurer: Peter Reid, Chateauguay Basin; directors: C. B. Edwards, Covey Hill; J. R. Marshall, Abbotsford; G. P. Hitchcock, Massawippi;

Geo. H. Dickson, Rectory Hill; J. M. Talbot, Quebec City; F. X. Gosselin, Island of Orleans; Abbe Lavasseur, Ste. Anne de la Pocatière; Rev. Fr. Leopold, La Trappe; Robt. Brodie, Montreal.

The following resolutions were unanimously passed:—

Whereas, it has been proven that the experiments carried on in the demonstration orchards are the best means of promoting progress in fruit growing in the province of Quebec, and, therefore, more demonstration orchards should be established throughout the province, and more field meetings be held in connection with these orchards; and,

Whereas, experts in plant pathology and entomology, whose services can easily be obtained during the summer months, should be engaged to study the many diseases of our orchards, and,

Whereas, our province suffers from a lack of knowledge by the general public of our best fruits, so that a 'publicity campaign' should be carried on during the season, in order to popularize and promulgate the excellency of our fruits, by advertising in the public press of our cities, by holding an annual exhibition in the city of Montreal during the fall; and by publishing for the benefit of the fruit-grower, such information as the Society may obtain from time to time.

Therefore, it is unanimously resolved that a delegation of this Society should meet the Hon. Minister of Agriculture, and place these views before him, so that this Society may be given a larger grant to carry out the above programme.

A feature of the convention was an exhibition of apples open to fruit growers of the province of Quebec. It included classes for collections of fruit, of twelve commercial varieties, of sections of each of fourteen varieties, five specimens each of best winter seedling and barrels and boxes of Fameuse and MacIntosh red. The exhibition was not large, but was pronounced to be of excellent quality.

THE QUEBEC HOMEMAKERS' CLUB

DURING the club year, 1915-1916, directed by Macdonald College School of Household Science, of which Miss Katherine Fisher is head, the Quebec Homemakers' Clubs accomplished much good work. Not only have the clubs carried out their regular study programme and done valuable community work, but in addition, have in every case materially assisted the national movement in Red Cross and other patriotic service. About twenty clubs worked independently for the Red Cross Society, the others in conjunction with other patriotic societies, and the records gave as the lowest possible estimate of the value of the work accomplished, and the money contributed as well over two thousand dollars. There were 189 applications for literature from the circulating library of the School of Household Science. The most popular topics were Textiles, source, manufacture; selection and tests for adulteration; laundry; sewing and the care of house plants.

The number of addresses and demonstrations given during the year to the clubs by the Demonstrator, Miss Frederica Campbell, was twenty-seven; demonstrations to school children, seventeen; by the other members of the staff of the School of Household Science, six; by the School of Agriculture, three. Organization meetings were held at Stanbridge East, Bedford, Simmons, Island Brook, Eaton Corner, Dundee, Ulverton and Kingsbury, and clubs were formed at Island Brook, Dun-

dee, Kingsbury and Ulverton. It was suggested that each club appoint a committee of extension workers to search out communities where Homemakers' Clubs would be of benefit and report to the County Executive, who in turn would arrange meetings for the Demonstrator in such places. Nine clubs applied for the loan of the Travelling Libraries and the clubs seemed to enjoy and make good use of the books.

In view of the urgent need for other forms of patriotic service, it was hardly expected that very much in the way of community work could be accomplished this year, but "Business as Usual" with a little more added seems to have been the motto of many of the older clubs. A number gave considerable attention during the year to stimulating the interest of the school children in matters pertaining to the home and the community by offering prizes for cookery, sewing and garden products at the school fairs. The clubs of Missisquoi county on learning that the Macdonald College Farm Demonstrator was not to remain there resolved to make an effort to continue in as far as they possibly could the School Fair work started by the Demonstrator. In many cases and particularly in Pontiac County the clubs have provided means to enable the Demonstrator to visit schools and give practical demonstrations to the children to aid them in preparing their exhibits at the school fair.

THE WOMEN'S INSTITUTES OF ONTARIO

AT the recent convention of the Women's Institutes of Ontario held in Toronto, resolutions were passed as follows:—

• Endorsing the appointment by the provincial Government of a Commission to seek a solution of the feeble-minded problem, and favouring direct taxation, if necessary, for the care of persons so afflicted.

Endorsing the proposition to apply to girls the provision to allow their year's academic standing when they leave to help on the farm, and recommending that the same allowance be made for work in domestic science, gardening, bee-keeping, etc., carried on in villages or towns.

Requesting the provincial Government to set aside a special grant for the continuation and extension of rural medical school inspection and treatment in different health districts in the province by making further provisions for medical service, and agreeing to give local assistance, financial and otherwise.

Asking women's institutes to co-operate in a request for better sanitary conditions at railway stations, on trains, and in the churches and Sunday schools of the rural districts, and to report to the Institute Branch of the provincial Department of Agriculture cases that seem to need attention.

To petition the Government to prohibit the manufacture and sale of ice cream as a luxury until the scarcity of milk is over and prices are normal.

Asking the provincial Government to provide facilities for the proper education of the blind.

That letters of sympathy be sent to the widows of Hon. J. S. Duff and Dr. C. C. James.

That Mrs. E. G. Graham, of Brampton, be re-appointed to represent the women's institutes upon the National Service Committee and National Council of Women.

ONTARIO VEGETABLE GROWERS' ASSOCIATION

THE twelfth annual convention of the Ontario Vegetable Growers' Association was held in Toronto on November 24th, 1916. Deputy Minister of Agriculture, W. B. Roadhouse welcomed the delegates. President F. F. Reeves, of Humber Bay, in his opening address, asked for more statistical information in order to permit of better planning. The secretary, Mr. J. Lockie Wilson, in his report reviewed the past year as regards vegetable growing and matters affecting the industry. He referred to the success of the Ontario field crop competitions and stated that the garden competition of the association, which had proved most successful, was conducted under the following rules:—

(1) Each garden must contain not less than three acres, but if it contains a greater acreage the whole plot will be judged. (2) Gardens will be judged twice during the season; the first judging will be done not later than July 10th, and the second not later than August 10th. (3) An entry fee of \$1.00 will be charged. (4) The province will be divided into four districts. (5) The following prizes will be offered: first, \$30; second, \$20; third, \$10. (6) Entries to be made to the Secretary of the Branch who will forward same to the Secretary of the Central Association. (7) Judges will be supplied free of charge by the Ontario Department of Agriculture.

Mr. Wilson suggested a system for the grading of vegetables. He also favoured the standardization of vegetables through a proper nomenclature. There were too many varieties, he said, included in seedsmen's catalogues. A named variety in one catalogue is often different from the variety sold under the same name by another seedsman. Discussions took place on the value of irrigation and the growing of early potatoes. The score card for the garden contests was revised and for the future will be as follows:—

Layout and general arrangement considering: —

	Points
(a) Straightness of rows and proper spacing of plants	10

(b) Arrangement of space in garden.	10
(c) Neatness and cleanliness around yards and buildings	10
Neatness, care and cultivation...	40
Cleanliness in fence corners, headlands and pasture lots.	10
Closeness of planting and market value of crop per acre to be considered.	20
Total.	100

If points are lost owing to natural difficulties impossible to overcome, the judge may allow a maximum of 5 points.

The reports of the Vegetable Specialist, Mr. S. C. Johnston, stated that weather conditions had handicapped him in his duties, but still demonstration and educational work had been carried on. Spraying of celery was becoming common and a good deal had been saved by the use of bluestone. Onion blight had been disastrous in the Kingston district and investigation so far had failed to show anything that would control the blight. Corrosive sublimate had proved effective in suppressing the root maggot in cabbage and cauliflower plants. Mr. A. McMeans, of Brantford, read a paper on vegetable root and seed production. Professor J. W. Crow, of the Ontario Agricultural College, spoke of results in this direction obtained at the College, illustrating his remarks with photographs. Mr. John Campbell, of Leamington, Ont., dealt with onion growing. Mr. J. D. Nairn, of Hamilton, described the methods pursued by him in the cultivation of tomatoes in the greenhouse. Other addresses were delivered and discussed and altogether the convention, although postponed from the date originally set owing to the funeral of the Hon. J. S. Duff, was most successful and interesting. It should be mentioned that the Vegetable Specialist, Mr. S. C. Johnston, illustrated his remarks with moving pictures taken on the field with growers at work.

CALGARY INDUSTRIAL EXHIBITION ASSOCIATION

THE annual report of the Calgary Industrial Exhibition Association for the year ending September 30th, 1916, has been circulated. It shows the largest attendance since 1913. The report is especially interesting from the fact that it records the results of the first year under the new system of awarding prizes according to the number of entries in each class and each section. While admitting that the system leaves something to be desired the report notes that "the prizes increased in number as well as in value, as the entries actually shown increased." In sending out the prize cheques criticism was invited and many replies have been received

pro and con. "The question is," continues the report, "will greater ultimate benefit result to the general stock interests of the district served by an exhibition by enlarging the number of stockmen who receive prize money for merit in the production of live stock than by paying all the money to the few at the top of the class with the consequent discouragement to new breeders becoming exhibitors."

A statement is given showing that the live stock events handled by the permanent staff of the exhibition, but not connected with the exhibition proper, had a turn-over during the year of \$286,225, as follows:

For the Alberta Sheep Breeders' Association .	\$ 94,525
For the Alberta Swine Breeders' Association .	2,050
For the Fat Stock Show	5,400
For the Alberta Horse Breeders' Association .	6,300
For the Alberta Cattle Breeders' Association.	102,375
For the Calgary Poultry Association . .	2,550
The above with the Exhibition turn-over of .	73,025

The entries in 1916 showed an increase of 85 over 1915, a deficit of 9 compared with 1914, and an increase of 339 over 1913, the most successful year in point of attendance, being 804 greater than in 1916. The amount offered in prizes in 1916 was \$18,627 and the amount paid \$18,186.95.

BREEDERS' ASSOCIATIONS RECORD MEETINGS

The annual meetings of live stock and record associations will be held in Toronto this year as follows:—

- Feb. 5—Canadian Swine Breeders' Association.
 “ 5—Canadian Thoroughbred Horse Society.
 “ 5—Canadian Pony Society.
 “ 6—Ontario Swine Breeders' Association.
 “ 6—Dominion Shorthorn Breeders' Association.
 “ 6—Canadian Jersey Cattle Club.
 “ 6—Ontario Berkshire Club.
 “ 6—Ontario Yorkshire Club.
 “ 6—Canadian Standard Bred Horse Society.

- “ 6—Canadian Sheep Breeders' Association.
 “ 7—Ontario Sheep Breeders' Association.
 “ 7—Canadian Hackney Horse Society.
 “ 8—Canadian Shire Horse Association.
 “ 8—Clydesdale Horse Association of Canada.
 “ 8—Canadian Hereford Association.
 “ 8—Ontario Horse Breeders' Association.
 “ 9—Dominion Cattle Breeders' Association.
 “ 9—Canadian Kennel Club.
 “ 9—Canadian Trotting Association.

The Ayrshire Breeders' Association meet in annual session at Mon treal this year.

THE ONTARIO PROVINCIAL WINTER FAIR

The Ontario Provincial Winter Fair was held in Guelph during the first ten days of December, 1916. The entries in each class were as follows: horses, 301; cattle, 335; sheep, 336; dressed carcasses, 79; fleece wool, 27; swine, 257; dressed carcasses, 38; seeds, 370; poultry, 5,231, dressed poultry, 167, eggs, 25; giving a total of 7,166 entries.

POULTRY DEMONSTRATIONS

Each day demonstrations in killing, plucking, dressing and trussing fowl were given by Miss Mary Yates. A number of demonstrations in caponizing were conducted by Mr. Burdin. These demonstrations were conducted under the supervision of the Live Stock Branch of the Ontario Department of Agriculture.

The Live Stock Branch of the Federal Department of Agriculture also had a display of eggs, showing the proper and improper methods of handling eggs intended for market.

THE INTER-COUNTY JUDGING COMPETITION

The inter-county stock-judging competition, which has become a prominent feature at Winter Fairs in Western and Eastern Ontario, was, in effect, a real and practical demonstration of the usefulness and efficiency of the District Representative system, which has been greatly developed during the past few years, and supported to a considerable extent by

funds provided under the provisions of THE AGRICULTURAL INSTRUCTION ACT.

Twenty-one counties were represented by teams of three boys each, each team having been trained by the District Representative for the county represented. The boys were required to judge, and give reasons for their judgment, two classes each of horses, dairy and beef cattle, sheep and swine. The team representing York county was first with a total score of 2,357 out of a possible of 3,000, with Durham, second, Simcoe, third, Waterloo, fourth and Haldimand, fifth.

A LIVE STOCK DEMONSTRATION

A valuable demonstration was conducted by Mr. W. J. Bell, of the Ontario Live Stock Department. In order to emphasize the difference between well-fed, over-fed and under-fed cattle, three steers were shown on foot, and three carcasses of steers of equal weight to them, when alive, were shown in a case close to the pens occupied by the live animals. One side of each carcass was whole, while the other side was shown as wholesale cuts, with prices attached. No. 1 steer, alive, weighed 1,830 lb., and his fellow, dressed, weighed 1,190 or 66 per cent of the live weight. No. 2 steer, an unfinished animal, over two years and three months old weighed 1,150 lb., while his dead mate weighed only 594 lb. dressed or 51¾ per cent. No. 3 steer was baby beef 12 months

old, weighing 850 lb., and the carcass of a similar steer weighed 560 lb. or 63.63 per cent. The purpose of the demonstration was to help in educating the beef producers of the country in the business of supplying animals such as are desired by the butchers and by the consumer on account of their economy.

THE DAIRY TEST

A three day's test for production was

again a prominent feature of the fair. Over 60 cows were entered, the highest honours going to Sunbeam of Edgeley, a mature Jersey, owned by Jas. Bagg and Sons, Edgeley, Ontario, that gave in the three days, 195.3 lb. of milk, testing 5.4 percent fat and making a total score of 317.84 points, this being 15.74 points in advance of last year's champion. The records made by the winning cow in each class are shown in the following table:

HOLSTEINS

Age, Months	Name	Owner	Lb. Milk.	Per cent Fat.	Total Points.
48 and over	Midnight Comet De Kol	J. G. Currie, Ingersoll, Ont	201 1	4 7	303 91
36 and under 48	Queen F. B. Payne	M. H. Haley, Springford, Ont	181 1	4 0	240 7
24 and under 36	Pontiac Jessie 2nd	Martin McDowell, Oxford Centre, Ont	144 5	1 0	185 9

AYRSHIRES

48 and over	Scottie's Nancy, 2nd	J. McKee, Norwich, Ont	170 3	4 7	247 1
36 and under 48	Susanna of Evergreen	E. B. Palmer & Son, Norwich, Ont.	185 1	3 5	210 7
24 and under 36	Ethel of Springbank	A. S. Turner & Sons, Ryckman's Cr's	112 3	4 4	155 7

JERSEYS

48 and over	Sunbeam of Edgeley	Jas. Bagg & Sons, Edgeley, Ont	195 3	5 4	317 84
36 and under 48	Brampton Raleigh Cowslip	B. H. Bull & Son, Brampton, Ont	87 3	4 6	135 85
24 and under 36	Queen Greta	Jas. Bagg & Sons	95 9	5 6	161 3

SHORTHORNS

48 and over	Royal Princess	S. W. Jackson, Woodstock, Ont	158 6	3 4	176 9
36 and under 48	Woodside Queen	S. W. Jackson	102 8	1 6	147 2

GRADES

48 and over	Nellie	Earl Grier, Woodstock, Ont	211 3	3 8	253 02
36 and under 48	May	Jacob Lerch, Preston, Ont	116 2	3	172 3
24 and under 36	Babe	G. B. Ryan, Tillsonburg	112 9	3 1	125 9

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE LIVE STOCK BRANCH

The Bacon Hog and the British Market, Pamphlet No. 21. A picture of a healthy looking sow with the inscription "Production and Thrift" on the title page is well indicative of the contents of this pamphlet, which is another of the series under the joint authorship of Messrs. John Bright and H. S. Arkell, Commissioner and Assistant Commissioner respectively, designed to encourage the improvement, in extent and quality, of live stock. It is hardly satisfactory to read that, at a time when market and opportunity were never better, there are fewer hogs in Canada than at any period during the past ten years, and that in the last five years the number of hogs has decreased one million. The pamphlet emphasizes the fact that not only is a change as necessary as desirable, but shows the splendid opportunity that is Canada's and how it can be seized. Figures quoted prove that as Denmark's trade with the British empire has decreased that of the Dominion has increased. It is, therefore, not alone opportunity but duty that lies before the country. The pamphlet calls not only for increased production of the bacon hog, but for regularity of production. For reasons that are explained "fat hog" raising is not as profitable to Canada as to the United States. Therefore the authors concentrate their attention for more and better breeding on the bacon hog. A statistical table and a diagram show the price of hogs and feed for the past 27 years, a second diagram the hog price variations by months every fifth year from, and including, 1890, and a third diagram the monthly receipts and prices at the Toronto stock yards for 1914, 1915 and 1916.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

MANITOBA

Rusted Wheat and the Seed Situation, by James H. Bridge, B.S.A., Cerealist, Manitoba Agricultural College. It is twelve years since there was so much rust in Manitoba as there was in 1916, and the object of this 12-page circular is to point out the importance of having seed thoroughly winnowed and tested before sowing. The Field Husbandry Department of the Manitoba Agricultural College conducts free seed tests. In addition a Seed Exchange Bureau has been established for the purpose of bringing into touch with

each other farmers who have good seed to sell and those wishing to purchase such seed. A statement is given in the Circular of the objects of the Seed Grain Commission appointed by the Dominion Government to act in co-operation with a representative from each of the Prairie Provinces to secure, clean and sack, when ordered, seed wheat, oats and barley.

SASKATCHEWAN

Eleventh Annual Report of the Department of Agriculture. This report covers a period of sixteen months ending April 30th, 1916. A book of 310 pages, it contains reports, with a number of illustrations, of the Acting Deputy Minister of Agriculture and the chiefs of the different branches, including those of the Chief Game Guardian, the provincial Bacteriologist and Analyst and the Director of Agricultural Extension.

BRITISH COLUMBIA

The Women's Institute Quarterly. With the October, 1916, issue, volume II of this publication was commenced. After telling how women's institutes were introduced into England and Wales, articles are given on the medical inspection of school children, on the protection of birds, on invalid cooking, on milk and tuberculosis, on hospitality, on the procedure for the election of officers, and on the scientific canning of vegetables. Among the contents are also minutes and notes of the conferences and activities of the Okanagan, Kootenay, Boundary and Vancouver Island Institutes.

Trees and Shrubs; Their Selection, Planting and Care, by J. W. Gibson, M.A., Director of Elementary Agricultural Education; Circular No. 6 of the Department of Education. Mr. Gibson has here given us a valuable treatise on the usefulness and cultivation of trees and shrubs. They add to the beauty of the landscape and are a glory everywhere. Published by the Department of Education, the pamphlet has special reference to the adornment of the school ground. It, however, treats of the planting of trees on streets, giving a list with description of the most suitable. In like manner a long list of shrubs recommended for school and home planting is given. The propagation of shrubs and vines receive treatment, and the injury caused by insects and fungous diseases is dealt with at some length. In short this thirty-page circular contains much information and instruction on a most interesting and important subject.

Department of Agriculture Tenth Annual Report. There are a number of sentences in this very comprehensive report of the Department's operations and activities during the year 1915 worth special quotation. Among them are the following:

"The year 1915 witnessed a very satisfactory forward movement in agriculture, the production in most lines showing a satisfactory increase over previous years.

"The year was generally a favourable one for crop production, the yield for most crops being considerably above normal.

"The quality of the dairy stock in the Province shows a very marked improvement. Many of the dairy herds seen in our chief dairying districts would be a credit to any country.

The Agricultural Act, 1915, was passed at the 1915 session of the Provincial Legislature, and under its provisions loans may be made to farmers, on approval of the Board of Commissioners appointed under the Act, for the legitimate development of their farms.

"This progressive policy (THE AGRICULTURAL INSTRUCTION ACT is referred to) of the Federal Government has proven of the greatest value and assistance in encouraging and promoting agriculture in Canada, and farmers universally throughout the Dominion have expressed the highest appreciation of the wisdom and foresight of the Hon. Martin Burrell, Minister of Agriculture, for the material assistance which has thus been rendered to the industry of agriculture.

"The activities of the Live Stock Branch of the Department have been largely increased and extended during the past year, due, no doubt, to the fact that the present tendency amongst farmers is more towards mixed farming and stock-raising.

"Six years ago there were probably not ten silos in the Province, while at the end of 1915 there were over 200.

"The active propaganda carried out by various organizations having as its object the consumption of home-grown produce in preference to the imported article, accounts to a large degree for the very satisfactory showing which is made in the decreased importation of fruits and vegetables generally into our Coast cities from foreign countries."

A feature of the report, which contains sub-reports from all the chief officials of the Department is a series of clear and handsome photographic plates of agricultural scenes and subjects.

MISCELLANEOUS

Canadian Percheron Stud Book. Vol. 2 of the Canadian Percheron Stud Book, just issued from the office of the National Live

Stock Records, Ottawa, makes a volume of 1007 pages. Besides the rules of entry, the minutes of the annual meetings from 1912 to 1915 inclusive, records of wins for those years at Canadian fairs and exhibitions, lists of officers and members, errata in Volume I, the book contains the registration of stallions from 2194 to 4568 and of mares from 2112 to 4545.

Canadian Holstein-Friesian Year Book. In chronicling the publication of this work a better description of its contents can hardly be given than is contained in the introduction written by the secretary, Mr. W. A. Clemons, who says:

"Volume V. of the Canadian Year Book presents in handy form all the records of milk and butter productions of Holstein-Friesian cows which have been admitted to the Record of Merit and Record of Performance of the Holstein-Friesian Association of Canada to April 30th, 1916. The classification of record cows under their sires and under their dams affords invaluable information regarding the families, which are uniformly great producers and cannot help but prove of assistance to all scientific breeders."

The book includes the rules of the Record of Merit, contains 556 pages, 4¼ by 5 inches, and is adapted to the coat side-pocket.

Entomological Society of British Columbia. Bulletin No. 9 of the Economic Series of the Society recently issued contains papers of interest to fruit-growers and farmers read at the fifteenth annual meeting in Victoria, B.C., on March 11, 1916. These papers are "Notes on the Woodtick (*Dermacentor Venustus*)" by J. Wm. Cockle, Kaslo; "The Cottony Maplescale (*Pulvinaria innumerabilis*)" by Tom Wilson, F.R.H.S.; "The Peaweevil in British Columbia" and "Some Orchard Insects of Economic Importance in British Columbia," by R. C. Treherne, Field Officer, Entomological Branch; "Entomology in the Public School", by J. A. Hamilton, Principal John Norquay Public School; "The Forest-Insect Problem in Stanley Park", by R. N. Chrystal, Field Officer for Forest Insects; "Superheating as a Control Method for Insects which Infest Stored Products", by Arthur Gibson, Chief Assistant Entomologist, Ottawa, and "Control of Cabbage-aphis by Parasites in Western Canada," by E. H. Strickland, Field Officer, Entomological Branch.

The Principles of Feeding Farm Animals, by Sleeter Bull, B.S., B.S.A., M.S., Associate in Animal Nutrition, Illinois College of Agriculture; 397 pages, 4¾ by 7¼ inches, and 87 illustrations; Toronto: The Macmillan Company of Canada; price, \$1.75.

Although primarily written for United States consumption the contents of this book are of universal application and of general value. The author has aimed to present the scientific facts underlying the art of feeding animals in such a manner that the work will be both suitable for a college text book and of value to the farmer who has not had the privilege of technical education in agriculture. In the first six chapters the author has discussed the scientific aspects of the subject and has en-

deavoured to present them in a simple, concise manner so that they may be easily understood, not only by the student but also by the feeder who desires to familiarize himself with the scientific principles forming the mainspring of the art of stock-breeding. Other chapters deal with the compounding of rations, the feed requirements of farm animals, miscellaneous concentrates, fodders and stovers, pasturage, silage, the fertilizing value of food-stuffs and so on.

NOTES

The Manitoba Department of Agriculture will conduct eighteen Rural Short Courses from January 8th to March 17th, inclusive.

The Peel County Branch of the Ontario Department of Agriculture has announced short courses in agriculture and domestic science to be held at Caledon, Ontario, from January 22nd, to February 2nd, 1917.

Honourable Duncan Marshall, Minister of Agriculture for Alberta recently announced that the Department of Agriculture is going to make some organized effort this winter to secure labour to meet the spring demand.

Upwards of forty live stock associations, or associations intimately connected with live stock, held meetings at Chicago during the International Live Stock Show, which took place at the Union Stock Yards from December 2 to 9, 1916.

Over 600 North Dakota farmers travelled to the International Live Stock Exposition at Chicago in two special trains fitted out with complete hotel accommodations. The South St. Paul stockyards and the University of Wisconsin were also visited.

The Poultry Division of the Department of Agriculture, Quebec, is endeavouring to secure the names of all breeders of poultry in the province of Quebec and intends to publish a complete poultry breeders' directory next year. A small fee of 25 cents is being charged to each party entering one breed of poultry and an additional fee of 5 cents for each additional breed.

A short course of instruction and practice in poultry-raising will be given at MacDonald College, Ste. Anne de Bellevue, from February 19th to March 2nd, 1917. Professor M. A. Jull, lecturer and manager, poultry department, is in charge of the course.

The amount of fall ploughing that has been done in Saskatchewan is noticeably less than the amount done in the fall of 1915, and much more so than in 1914 as the following figures will show: 1914, 4,407,320 acres; 1915, 1,731,497 acres; 1916, 1,246,677 acres.

The Department of Agriculture in British Columbia is again offering pruning and fruit-packing schools. The Department provides competent instructors, while the local administration of the schools is in the hands of a responsible local body—Farmers' Institute, Fruit Growers' Society or Board of Trade.

The University of British Columbia is offering a three-weeks course in horticulture between the dates of January 8th and January 26th, 1917. Lectures and demonstrations will be given on all of the subjects pertaining to horticulture including soil formation, plant growth, landscape problems, insecticides and fungicides, entomology, plant diseases, etc.

An alfalfa and clover huller was last year purchased and operated by the British Columbia Department of Agriculture. The machine was operated on 25 or 30 experimental plots in 1916, and on three kinds of crops, alfalfa, red clover and sweet clover. While climatic conditions were not considered suitable for heavy seed production, yields varying from a few pounds to 200 pounds per acre were obtained.

At a representative meeting of the farmers of Vancouver Island held at Duncan, B.C., on November 4th, a Farmers' Union was formed. The objects were declared to be to act collectively where the common interests were concerned, to ensure a steady supply of farm labour at fair wages, to promote and facilitate farm credits and to obtain an improved transport service at permanently fixed rates.

The University of British Columbia has made provision for the holding of a short course in horticulture in the month of January. The various members of the Faculty of Agriculture will assist the Department of Agriculture at public meetings and in other ways during the months of February and March. This will enable the staff to make a first hand study of conditions throughout the province and so help to pave the way for the putting on of a regular course leading to the B.S.A. degree next autumn.

Arrangements have been made by the Department of Agriculture of New Brunswick to conduct the Better Farming Special this year on a more extensive scale than usual. A start will be made in July and as many as possible of the farming sections of the province will be visited. Instead of lectures being given on the train, as in former years, a stop of two or three days will be made at the leading centres and public meetings held at which agriculture will be the sole topic and addresses will be delivered according to a schedule prepared by the Department.

R. S. Duncan, B.S.A., District Representative of the Ontario Department of Agriculture for Durham County has announced the Sixth Annual Course in Agriculture to be held from January 9th to February 9th, 1917. During this course all subjects pertaining to general agriculture will be thoroughly discussed and studied. A number of public speakers and experts in particular lines will give assistance to Mr. Duncan. In connection with the course a number of competitions will be held including stock judging and public speaking and prizes will be given for an essay on "Weeds and their Eradication" and on the "Management of Bearing Orchards."

The annual stock judging competition for young men of Essex county, Ontario, 25 years of age and under, and judging for the

County Cup valued at \$50, was held at Leamington, December 15th. Six classes of stock were the subjects of competition, light horses, heavy horses, beef cattle, dairy cattle, sheep and swine. This competition always demands considerable interest and keen rivalry among the boys of the county. The winner was J. H. Wilcox, S. Woodslee, who has won this cup the second time. The cup to be won three times before becoming the permanent property of the winner. The prizes offered were as follows:—

- 1st—1 hog waterer, value \$3.25.
- 2nd—1 bushel Wisconsin No. 7 corn, value \$3.00.
- 3rd—Hatching eggs, value \$3.00.
- 4th—Types and breeds of Farm Animals, value \$2.50.
- 5th—Judging Live Stock, by Craig, value \$2.00.
- 6th—Judging Live Stock, by Craig, value \$2.00.
- 7th—Swine, by Day, value \$1.25.
- 8th—Swine, by Day, value \$1.25

The Agricultural Organization Society of Great Britain, founded in 1901, the boast of which is that it does no trade and makes no profit, had at the end of its fiscal year, March 31, 1916, upwards of 560 affiliated societies. Its objects are: advocacy of the principles of co-operation amongst farmers; the giving of advice and assistance in the formation of properly registered co-operative agricultural societies in suitable districts and generally of trying to secure better organization on the business side of the agricultural industry in England and Wales. In 1901 there were 25 affiliated societies with a membership of 517 and a turnover of £9,467. In 1915, there were 561 affiliated societies with a membership of 56,300 and a turnover of £3,428,960. The most recent branch of activity undertaken by the society is superintendency and promotion of women's institutes, the organization of which is a recent movement in England, transported from Canada and inaugurated by Mrs. Alfred Watt, M.A., member of the governing board of the Senate of the University of British Columbia and Honorary Secretary of the National Council of Women's Institutes of Canada. At the end of March, 1916, there were 18 Women's Institutes in England and Wales. Under the editorship and direction of Mrs. Watt a number of leaflets and pamphlets have been issued in England and Wales pointing out the aims of the institutes and the privileges that are enjoyed by members. Emphasis is naturally laid in these publications on the progress the institutes have made and the services they have rendered, and are rendering, in Canada

INDEX TO PERIODICAL LITERATURE

- The Saturday Press and Prairie Farm*, Saskatoon, Sask., December 2nd, 1916.
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Draft Horses for Alberta, page 874.
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The Saskatchewan Department of Agriculture. Its History and its Services, F. H. Auld, Deputy Minister of Agriculture for Saskatchewan, page 878.
Alberta Schools of Agriculture, W. J. Elliott, Principal, School of Agriculture, Olds, Alta., page 888.
December 20—Improvement of Saskatchewan Wheat, G. H. Cutler, Department of Agriculture, University of Saskatchewan, page 934.
Agricultural Education in Alberta, Professor E. A. Howes, Dean of the Faculty of Agriculture in the University of Alberta, page 936.
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Profitable Winter Feeding of Cattle, F. S. Jacobs, B.S.A., Professor of Animal Husbandry, Manitoba Agricultural College, page 779.
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Outlook for Farmers Who Depend on Bought Feeds is Serious. More Concentrated Foods are Cheaper than Others at Present Prices in Spite of Costing More Money, S. H. Hopkins, Assistant Live Stock Commissioner, page 165.
Growers Should Study Potato Production and Potato Industry, R. M. Winslow, Provincial Horticulturist and Inspector of Fruit Pests, page 166.
Insects Affecting Agriculturists in British Columbia, During the Past Year, R. C. Treherne, Field Officer, Entomological Branch, Dominion Department of Agriculture, page 168.
Seed-Threshing Demonstrations bring Interesting Facts to Light, H. O. English, Chief Soil and Crop Instructor, page 170.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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CONTENTS

The Short Course	PAGE 101
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PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
Establishing an Orchard on the Prairie, by S. T. Bjarnason	102
Pasture Crops in the Prairie Provinces:—	
Brandon, Man., by W. C. McKillican	103
Indian Head, Sask., by T. J. Harrison	106
Rosthern, Sask., by Wm. A. Munro	107
Scott, Sask., by R. E. Everest	108
Lacombe, Alberta, by G. H. Hutton	108
Lethbridge, Alberta, by W. H. Fairfield	109
The Dairy and Cold Storage Branch:—	
The Use of Brine Tank Refrigerator Cars for Fruit Shipments	110
Dominion Department of Agriculture Honour Roll	114
The Entomological Branch: -	
Some Results of Spraying Experiments in Nova Scotia in 1916, by G. E. Sanders	115
The Health of Animals Branch:--	
Hog Cholera by Geo. Hilton	119
The Seed Branch:—	
Field Root and Vegetable Seed Growing in the Maritime Provinces, by S. J. Moore	122

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Irrigation Results in 1916:	
Macdonald College by W. J. Tawse	124
Ontario Horticultural Experimental Station, Vineland by E. F. Palmer	125
The Ontario Ag-icultural College by Prof. J. W. Crow	127
The Potato Crop of 1916:	
School of Agriculture, Ste. Anne de la Pocatière by H. Bois	128
Ontario Horticultural Experimental Station by E. F. Palmer	128
New Brunswick:--	
Land Settlement Scheme after the War by J. B. Daggett	130
Quebec: -	
Agricultural Legislation	131
The Committee on Agriculture	132
The Inspection of Nurseries by Georges Maheux	132
Louis Hébert	135
Secretary, Department of Agriculture.	135

Ontario:—	
Acre Profit Competitions by C. F. Bailey. .	136
Feeding Hogs for Profit Competitions by C. F. Bailey	138
Saskatchewan:—	
Creameries Amalgamation .	140
British Columbia:—	
Co-operation in Dairying by T. A. F. Wiancko	140
Boys' and Girls' Clubs by H. O. English	141
Field Crop Competitions by H. O. English .	142

PART III

RURAL SCIENCE

The Teaching of Household Science: -	
Quebec by Fr. O. L. Martin.	143
Macdonald College by Katharine A. Fisher	146
Manitoba:—	
Household Science in the Brandon Normal School	147
British Columbia:	
Agriculture in High Schools	149

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Agricultural Legislation in Canada: -	
The Protection of Sheep	150
The Demand for Trained Men in Agriculture	152
Warm Lunches for Rural School Children	153
Boys' and Girls' Calf Clubs	153
Variation in Wheat	154
Associations and Societies	154
New Publications	161
Notes	162
Index to Periodical Literature	164

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OF CANADA

VOL. IV

FEBRUARY, 1917

No. 2

THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at \$1.00 per annum, or 10 cents per copy.

Subscriptions should be forwarded to the Editor, Agricultural Gazette, Ottawa.

THE SHORT COURSE

THIS is the season of the Short Course. In practically every province classes of men and women are assembled to add to their knowledge of farming and gardening and of the affairs of domestic economy. The Agricultural Colleges and Schools are holding their Short Courses for those who are not able to attend for the regular terms, while the District Representatives and others are directing classes throughout the provinces. That these "Schools" are proving a great incentive to better practice there can be no question. They are not expected to teach men to farm or women to keep house, attend to their families and make their own clothes, but to discuss and demonstrate in ways as practical as possible the main principles which make for success in the every day affairs of the rural community. Nor are the rural districts only being served in these classes. The needs of urban residents are not being overlooked. For the first time, perhaps, a short course has been held on suburban gardening. To encourage the growing of edible crops in back yards and vacant lots Macdonald College has, this winter, held a course in the city of Montreal and great good is expected from it.

The factors operating against attendance at the colleges and universities are felt in the short courses. Boys under military age are most conspicuous in the classes for men. In the minds of these the seed will find a fertile soil. The women's classes are better attended and great good thus accomplished. Rural women have too long endured comparative isolation and inefficient equipment for their work. The short course is not only revealing some of the lacks in the home but opening the way for better living, greater self reliance and increased capacity for efficient and satisfying service.

The short course is not a new institution. In the earlier years it was confined to the colleges. By virtue of THE AGRICULTURAL INSTRUCTION ACT it has been developed and extended until it has been brought to the very doors of the people in the rural districts where the greatest service can be afforded.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

ESTABLISHING AN ORCHARD ON THE PRAIRIE

BY S. A. BJARNASON, B.S.A., HORTICULTURIST, EXPERIMENTAL STATION,
MORDEN, MAN.

AT the new Dominion Experimental Station at Morden, Man., described in THE AGRICULTURAL GAZETTE for June, 1916, it is proposed to carry on experimental work in horticulture on a larger scale than has hitherto obtained at any of the experimental



VIEW OF ORCHARD, EXPERIMENTAL STATION, MORDEN, MANITOBA
Hedge of Caragana, on left; rows of seedlings and fruit trees, centre and right. Rape grown between rows of trees and seedlings. Picture taken in the fall of the first season, i.e., 1916

farms and stations on the prairies. Cultural and variety tests and the selection and breeding of horticultural plants will be conducted and it is hoped that after a time, a certain amount of material will be available for distribution.

In the spring of 1916, the foundation was laid for extensive fruit-growing experiments. Eight acres were planted to apples, plums, cherry hybrids and small fruits and considerable nursery seeding was done. At present, no natural or artificial protection for these plantations exists beyond the hedges of caragana which were planted in 1915. These run at 90-foot intervals, east and west through the orchard and nursery. At present they are of little value as a protection but are expected to grow up with the fruit trees and shelter the latter when they have reached the bearing stage. Rape was sown between the rows late in July, and serves a good purpose in catching the snow and thus protecting the roots of the grafted trees and seedlings.

The apple orchard consists of a large variety of hybrids, some yet unnamed and previously untried in the West, a number of standard varieties of Russian origin, and other

varieties which have given promise of hardiness. Between the grafted trees are planted seedlings (about 28,000 in all) of hardy varieties. If these survive the hardships of early life, they will be transplanted later to permanent locations and their desirability further tested.

The plantation thrived very well during the past summer. Very few plants were killed as a result of the transplanting. Trees and bush fruits both went into "winter quarters" in good condition, but it seems almost certain that some of the weaker trees will succumb during the cold season.

With this orchard as a nucleus—a testing ground for trees and seedlings—it is hoped that a permanent orchard can soon be established, where the question of fruit growing on the prairie will be definitely settled.

The hardiness of small fruits has already been ascertained, but little or nothing has yet been done in the West to grow them on a profitable basis. The Morden station hopes, in the near future, to demonstrate, on a commercial scale, just what may be done with our hardy small fruits, most of which are found native on our prairies.

PASTURE CROPS IN THE PRAIRIE PROVINCES

BRANDON, MAN.

BY W. C. MCKILLICAN, B.S.A., SUPERINTENDENT

THE question of providing suitable pasture for live stock is one of the greatest difficulties in mixed farming in the West. So long as there is plenty of vacant land which may be pastured without any cost, there is no trouble, but as soon as a district gets well settled and most of the land is in use, then pasturage must be obtained on owned or rented land and becomes costly. As a general rule, it may safely be said that pasturing native

grasses on land that is purchased or rented, does not pay. There are, of course, exceptions to this in steep ravines, bushy land, etc., where it is impossible to plough, or in areas of range land obtained very cheaply. But wherever the land can be ploughed, a much larger amount of feed per acre can be obtained by breaking it up and sowing some more productive crop than native prairie grass. Thus wherever close settlement and mixed farming become the rule, the

question of getting satisfactory pasture for stock is a live one.

The limited supply of rainfall in Western Canada makes the production of abundant pasturage somewhat difficult. In the growing of other crops it is possible to conserve the moisture by means of methods of cultivation, but once it has been started, pasture has to live on the moisture as it falls, with very little reserve supply. For permanent pasture it is therefore necessary to use crops that have great powers of drouth-resistance and at the same time produce abundantly. Heretofore successful pasturage has been either on well-watered land, or else if on dry land, on such extended areas that the limited amount of feed per acre is compensated for by the greater area. The settler on a quarter-section or half-section of land in a region of light rainfall has a distinctly different difficulty to face.

PERMANENT PASTURE

It must be confessed that there is no grass in use in Western Canada that is an ideal pasture grass for the climate. Decidedly the best now in use is Brome grass. It is drouth-resistant and hardy, it gives early pasture in the spring and late in fall. But it gets dry and bare in mid-summer, and, when it gets a few years old, it develops a tough, dry, unproductive sod. It is also very persistent and troublesome if the land is to be broken up and used for other crops. Nevertheless, it is really the only successful permanent pasture grass in use in the West. Western Rye grass and Timothy, while very good for hay production, are not good pasture grasses, as they are not productive enough especially in later summer and fall. They may be mixed with Brome grass with good results, but are not very satisfactory alone. Alfalfa, while of the greatest value as a hay crop, is not very satisfactory as a pasture except for pigs. For sheep and cattle it is quite

dangerous, as it is likely to cause bloat. It may be pastured by these animals if they get only a little, mixed with grass pasture. Alfalfa does not stand pasturing well and usually kills out when pastured. As it is of such great value for hay, it does not pay to destroy it by pasturing. For pigs, it makes excellent pasture, and though the pigs kill it in a few years, it pays to use it on account of the excellent results in making economic gains in pork production.

It is possible that better grasses and legumes for permanent pasture may be discovered or developed. At present, permanent pasture is not a profitable use to make of arable land. Land that is badly cut up with sloughs, woods or coulees may be kept in permanent pasture, because it could not be profitably cultivated. It is also advisable to have a small area of permanent pasture near the buildings for runs for stock, night pasture for milk cows, etc. But, beyond that, no permanent pasture should be maintained on good arable land in the West as the return from it is not large enough.

PASTURE IN ROTATION

The principal source of pasture on the mixed farm should be fields of mixed grasses and clovers grown in rotation with other crops. Grass crops in the West are most productive during the first and second years after seeding. After that the yield dwindles down from year to year. It is therefore the wisest course to grow them for a couple of years only and then plough up again. By arranging the farm and crops in a rotation including one year of hay and one of pasture, the crop of hay may be cut every season from the land seeded the previous year and the season of pasture is obtained the second season. If moisture has been conserved in the previous seasons and conditions of drouth are not too severe, a good amount of pasture can

be obtained each year from land handled in this way. Mixtures used for this purpose on the Experimental Farm include, Timothy, Western Rye grass and Red clover; Brome grass and Alfalfa may also be used. In one rotation, a mixture of 8 pounds of red clover and 5 pounds of Timothy is sown along with barley. The first season, a crop of hay composed mostly of red clover is cut, and a lot of splendid fall pasture is obtained and the clover aftermath. The next season the field is pastured, Timothy comprises most of the growth and it grows much more abundantly for having had the clover with it the year before, than it would alone. This pasture is ploughed up as soon as the hay is taken off the adjoining field of the rotation.

ANNUAL PASTURE CROPS

Pasture may be supplemented by sowing crops to be eaten off by stock the same season as sown. Rape is one of the best for this purpose. It produces a large amount of good feed and at the same time can be used as a cleaning crop. It may be sown at any time from the end of April until the middle of July and will be ready for pasturing about five to seven months after sowing. It may be sown broadcast if the land has a good supply of moisture and fertility and is reasonably clean. But it is best to sow it in rows about two and a half to three feet apart and then cultivate between the rows to keep the land clean. It is especially valuable for pigs, but may be also used with advantage for sheep and cattle. It should not be allowed to get too mature before using as it is less digestible. When a reddish tinge begins to show, it is an indication that the best stage for pasturing is past.

Various grain crops may be used for pasturing. Oats are the favourite for this purpose, and rightly so. Barley and wheat mixed with oats are often used. Oats make the leafiest growth and cattle seem to like

them best. In sowing grain for pasture, it is advisable to sow a larger quantity of seed than would be right if the grain were to be allowed to grow. Four bushels of oats are not too much to sow per acre, and proportionate quantities of barley and wheat may be used. A good grain to mix with the oats is the field pea. Peas add to the value of the grazing and at the same time have a beneficial effect on the soil. A mixture of three bushels of oats and one bushel of peas per acre is highly recommended.

Grain mixtures for pasture may be sown at different dates depending on the time at which they are needed. As grass pasture is usually shortest in mid-summer, it is a good plan to have some supplementary pasture ready at that time. Sowing about June 1st, and again about June 15th or July 1st will bring a good growth on about the right time.

Fall rye may be used quite successfully for supplementary pasture. It should be sown in September or the last of August at the rate of 2 bushels per acre. It will provide some late fall pasture and will then be ready in the spring before any crop except Brome grass.

Sweet clover has been much boomed recently as a fodder and pasture crop. It is my opinion that its value has been greatly exaggerated. It grows wild on the roadsides and the cattle do not touch it while there is any grass to be found. It has a bitter flavour which renders it distasteful to stock. This is not so objectionable when the plant is young but develops as it gets older. Sweet clover may be of some value as a pasture in light land, but will have to be pastured off when young and cannot be depended on for any length of time.

PASTURE ON SUMMER FALLOW

The practice of using summer-fallowed land for pasture is increasing rapidly throughout the West.

Whether or not it is a wise practice depends entirely on the surrounding circumstances. The principal consideration is the relative importance of the conservation of soil moisture. There are large areas in Western Canada where the question of moisture is by far the most important in crop production. At best the moisture supply is none too great, and in some seasons serious drouths occur. In this territory the pasturing of summer fallows is decidedly wrong. Of course, there is no harm but rather benefit, from the cattle tramping over the fallowed fields but there should not be anything there for them to eat. For the effective conservation of the moisture in a field, absolute bare cultivation is the only proper method. Repeated cultivation and the prevention of weed growth insures the saving of the moisture, and next year's crop, but it provides no feed for stock. In other regions and especially in Manitoba, the conservation of soil moisture is a secondary object of summer fallowing, the main purpose being the killing of weeds. In this land, if dry farming is carried out to perfection, the result may be too much moisture in a wet year and consequently, lodged and unsatisfactory crops. Much of this land, too, is in danger of drifting and too thorough cultivation increases this danger. Where wild oats are the principal

weed to be killed, pasturing is a more effective method of eradication than is cultivation. The tramping induces germination, whereas the dry surface mulch, particularly if very loose, often prevents complete germination. Then wild oats make the very best of pasture; they are tasty and rapid growing and come again after being cut off. Where Canada thistle, Sow thistle or Couch grass are prevalent, pasturing will not do as a substitute for cultivation. Only very persistent and thorough cultivation can eradicate them, and the land where they are found should be kept black all summer. However, they are often found only in spots and it is then quite practicable to use most of the field for pasture, while concentrating attention on thorough cultivation of these spots.

Land that is being summer-fallowed, and at the same time used for pasture, should be disced or skim ploughed in the previous fall or early in spring if possible; this will cause the weeds to start and will make early pasturage. It should be ploughed as for ordinary fallowing, at least six inches deep early in June. It should then be harrowed down. If wild oats are very thick they may provide enough pasture, but it is usually advisable to use in addition either a mixture of grain or rape as already described in this article.

INDIAN HEAD, SASKATCHEWAN

BY T. J. HARRISON, B.S.A., SUPERINTENDENT

GENERALLY speaking, the most suitable grasses for Southern Saskatchewan are Western Rye, Timothy, Meadow Fescue, Brome grass and Red Top. Of these, Brome grass and Western Rye are best adapted to a wide range of conditions.

Alfalfa is well adapted to the climatic conditions of Southern Saskatchewan and should be included in

every hay and pasture mixture. It is hardy and has the ability to withstand the winter and produce large crops of forage. Alfalfa is truly the queen of forage plants, unexcelled for feeding dairy cattle, relished by all classes of live stock.

To insure good success in growing hay and pasture grasses, the following factors should be considered: adaptability, place in rotation, soil

preparation, amount of seed to sow, seeding with and without a nurse crop, alone or in combination, for hay or for pasture. These principles are general rather than specific in their application.

The following mixtures are recommended for districts in Southern Saskatchewan:

For hay in dry districts:—

Alfalfa, 8 pounds per acre.
Western Rye, 8 pounds per acre.

For pasture in dry districts:—

Brome grass, 8 pounds per acre.
Western Rye, 4 pounds per acre.
Alfalfa, 4 pounds per acre.

For hay in moist districts:—

Western Rye, 8 pounds per acre.
Timothy, 4 pounds per acre.
Alfalfa, 4 pounds per acre.

For pasture in moist districts:—

Meadow Fescue, 8 pounds per acre.
Alfalfa, 4 pounds per acre.
Timothy, 4 pounds per acre.

The above mixtures are considered more or less applicable for Southern Saskatchewan and should be seeded in time to get the benefit of the spring rains, on well prepared fallow, preferably without a nurse crop.

ROSTHERN, SASKATCHEWAN

BY WM. A. MUNRO, B.A., B.S.A., SUPERINTENDENT

I regret to say that as we have not had live stock at this station, we cannot speak with first hand information on pasture crops. We can perhaps make very fair inferences from our experiences in hay crops.

In six seasons there have been two failures in the Western Rye hay crops, and they were very signal failures. There have been four good hay crops, but even in the good years there was poor growth after the cutting in July.

Brome grass gave a somewhat better aftergrowth, but in the two dry seasons even its' aftermath was light.

Timothy is much inferior to either Western Rye or Brome either in yield as hay or in growth after cutting. Timothy is especially poor in a dry season.

Winter rye sown early in August makes good growth in the autumn, and is used by some farmers for fall pasture. They do not allow it to be pastured very closely in the autumn, and in the spring it serves again as

early spring pasture. It is found that some seasons are too dry for the germination of the seed sown in August, and it does not start in time to afford fall pasture. In any case it must be sown on summer fallow.

Oats or barley or either with a percentage of peas sown in late June or July afford pasture at a time when most of the other pasture crops are dried up.

I have not grown, nor have I seen in the district, any one crop that would answer as pasture from seed-time to harvest. The hay crops dry out in the summer, and the grain crops do the same, or ripen, after which they are of no use. To secure continuous pasture there must be at least three crops, viz.: Winter rye for early spring pasture, late sown grain for the summer, and rye again for fall. This means extensive fencing which presupposes more expense than the farmers in this district are prepared at present to bear.

There are possibilities with rape and alfalfa, but I have not had an opportunity to try them sufficiently to give an opinion.

SCOTT, SASKATCHEWAN

BY R. E. EVEREST, B.S.A., SUPERINTENDENT

HITHERTO, extensive areas of unbroken land have provided an abundance of pasturage for the live stock kept in Northwestern Saskatchewan. As more land is broken, the numbers of live stock increase, and the necessity of returning fibre to the soil becomes more urgent, farmers will require some pasture crop that will afford generous feeding. With an average rainfall during the six growing months, (from April to September) of only 12.4 inches, some difficulty will be experienced in securing a satisfactory pasture.

On the Experimental Station, the main cultivated pasture crop has consisted of a mixture of 10 lb. Western Rye grass, 3 lb. of Red clover, and 3 lb. of Alfalfa. The seed is sown with a nurse crop; the second year a crop of hay is taken off, and the crop pastured during the third year; the fourth year the pasture is broken up early in the

season and well cultivated throughout the summer, so as to conserve the moisture for the succeeding crops of grain.

The profits from the hay crop have averaged \$5.30 per acre. The pasture returns have usually only paid expenses.

While the grass crops do not bring as large a direct profit as does growing cereals, yet, the incorporation of hay and pasture crops has been found profitable at this Station. The average returns per acre for the past four years from the ordinary rotation similar to that followed on the grain farms, has only amounted to \$5.43. Where grass for hay and pasture has been added to the grain farming rotation, the profit per acre has amounted to \$7.88. The increased yield of grain secured, together with the decreased cost of keeping weeds under control, more than balances the loss of profit in the pasture year.

LACOMBE, ALBERTA

BY G. H. HUTTON, B.S.A., SUPERINTENDENT

THE question as to how to provide pasture in greater abundance than equal areas of prairie grass is becoming a pressing problem in the more thickly-settled districts where it is no longer possible to run stock on adjoining, open lands. From three to six acres of prairie grass are required to maintain a 1,200 pound animal in good growing condition throughout the pasture season from the middle of May to the first of November. There is as wide a variation of productiveness under prairie conditions as exists under different systems of farm management. Soil and climatic differences account for the wide

variation in quality of pasture in different districts, particularly affecting the maturity of the grass in the fall, which determines the value of the grass for late fall or winter pasture.

One hundred and two head of two and three-year-old steers on native grass during the season of 1915 made an average gain of 358 pounds in weight during the season, weighing at the close of the pasture year 1,226 pounds. These cattle were weighed out to pasture in four groups and were weighed in November in the same groups, and since the spread between the average gain of each group and the average gain

of the entire number was not great the gain made is believed to be a fair average for this class of cattle with abundant pasture.

The area of cultivated grass required to maintain a 1,200 pound animal in good growing condition from the middle of May to the first of November will vary from one-and-a-half to three acres. Cultivated grass pastures for cattle at this Station so far tested are those grasses used in the regular rotation, involving the production of hay the first year and being used for pasture the second and third seasons. Timothy and Alsike clover are used, being seeded at the rate of four pounds of timothy and three pounds of alsike clover per acre, with a nurse crop of barley. The stock-carrying capacity of such pasture as determined by our rotation figures is twice that of the same kind of land under prairie conditions. A number of fields are being laid down to a permanent pasture of Kentucky Blue grass in those districts which are suitable for the growing of this variety of grass. All those districts which carry a heavy black loam soil are suitable for the growing of Kentucky Blue grass and, judging from the inquiries received in regard to a suitable permanent pasture grass, the areas laid down to

Kentucky Blue grass for permanent pasture will be increased. This grass produces a luxuriant growth, which is available early in the season and continues green late into the fall.

We have as yet no data showing the capacity of the blue grass for carrying stock as compared with timothy and alsike clover, but in my opinion the blue grass is decidedly superior.

No annual crops have been grown for pasture here, though winter rye is being used to quite an extent by dairymen for early spring pasture.

A number of native crops have been tested with regard to their value for pasturing hogs. The data available at present indicate the value of rape, and oats. Alfalfa has proven the best continuous pasture, and the value of any pasture is shown by the fact that an average saving in the grain cost of producing pork is \$1.75 per 100 when pasture is used, as compared with the cost of gains made by hogs confined to runs where no pasture was available. The hog-carrying capacity of these different pastures varies from ten to fifteen head and on the basis of the grain saving effected, land used for hog pasture will produce as large net profits as that under any average farm crop.

LETHBRIDGE, ALBERTA

BY W. H. FAIRFIELD, M.S., SUPERINTENDENT

ONE of the most difficult problems that confront the mixed farmer on non-irrigated land in the southern part of Alberta is to provide a cheap and abundant pasture for his stock during the summer.

Of the perennial grasses, Brome has without doubt demonstrated its ability to produce more feed than any of the cultivated grasses, as well as having the advantage of starting early in the spring and keeping up

growth until late in the fall. Notwithstanding its bad feature of being extremely persistent, for when it is once established it is often difficult to eradicate, and having once become started among trees and shrubs, it is extremely difficult to handle, it is about the only perennial grass that can be confidently recommended to give reasonable satisfaction as a pasture crop in the drier parts of the district. For a hog pasture, alfalfa planted in rows is

very satisfactory, providing it is not pastured until it becomes well established and then not too closely. It should not be pastured the first season the crop is planted. Among the grains the most satisfactory pasture crop is Winter Rye. When this is sown in the early fall on well-

prepared summer fallow it produces considerable pasture during the fall and starts growth first thing in the spring and can be pastured all that summer, affording a considerable amount of feed, providing rains come opportunely.

THE DAIRY AND COLD STORAGE BRANCH

THE USE OF BRINE TANK REFRIGERATOR CARS FOR FRUIT SHIPMENTS

AT the cold storage warehouse operated by this Branch at Grimsby, Ontario, experiments have been carried out to determine the value of various methods of precooling, packing and shipping tender fruits over long distances. In 1916 the use of the brine tank refrigerator car was carefully studied. Certain objections to this car have been taken by growers and shippers, but these have been on unsatisfactory

that require low temperatures, and, as the shipping of fruits, comes only during a portion of the year, and a dual purpose car has been required, they have favoured its adoption. With shippers and consignees ruling against and often refusing to accept these cars for shipments, and the railways increasing their supply, a problem has been presented to the Department of Agriculture, which has resolved itself into the work of

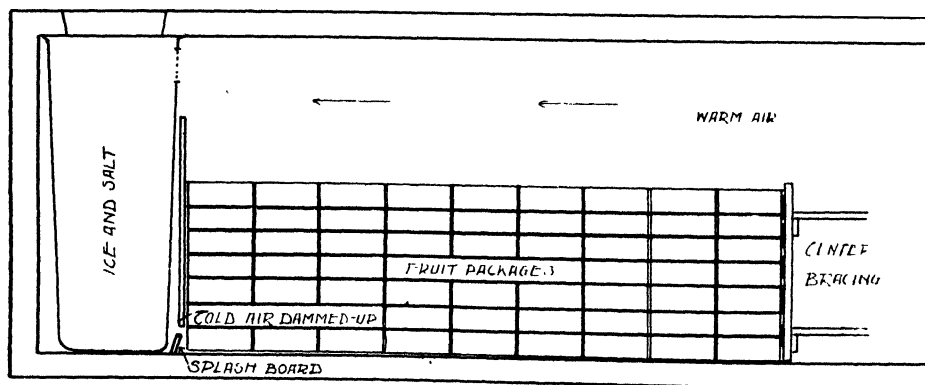


DIAGRAM 1. BRINE TANK REFRIGERATOR CAR LOADED WITHOUT SLATTED FLOOR RACKS, SHUTTING OFF THE COLD AIR FROM THE CENTRE OF THE CAR

experience resulting from heavy losses incurred owing to high temperatures in shipments made with this type of refrigerator car. On the other hand, the railways of Canada have found this car admirable for shipping such perishable produce as poultry, meats and dairy products

making the brine tank refrigerator car efficient for the shipment of fruits and vegetables. Since the season of 1913, when the investigational work was started, great progress has been made toward this end, so that at the present time many very satisfactory shipments of ten-

der fruits are being made in brine tank cars, and shippers who understand the proper methods of using them are accepting them for such shipments without complaint.

THE METHOD OF USE

In using the brine tank refrigerator car for shipments of dressed

atures are maintained in the car during transit, even in hot weather. When fruit shipments were undertaken in these cars the use of salt was omitted through the supposed danger of freezing, the ice being put in the tanks in block form, similar to the method of icing the bunker or block-ice type of car. Herein lays

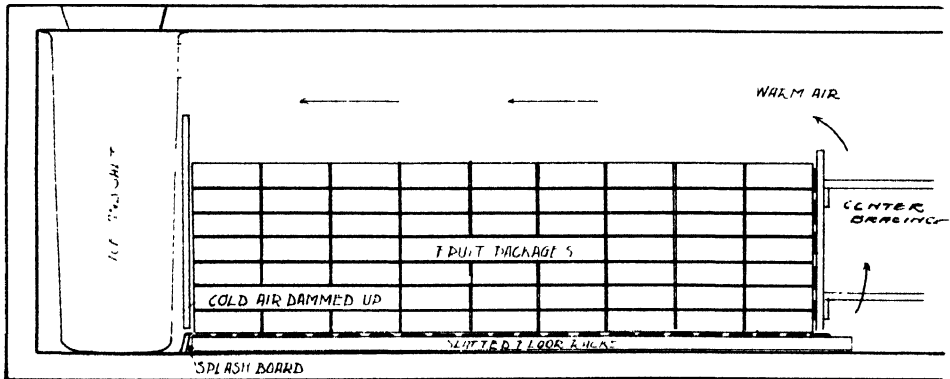


DIAGRAM 2. BRINE TANK REFRIGERATOR CAR LOADED WITH SLATTED FLOOR RACKS, BUT HAVING A SPLASH BOARD THAT BLOCKS THE COLD AIR FROM THE COLD AIR PASSAGE THUS PROVIDED

meats or poultry from 10 per cent to 20 per cent of crushed rock salt is customarily mixed with the ice. This melts the ice rapidly, removing the heat from the interior of the car and causing temperatures to fall below freezing. By the continued use of salt re-icing, freezing temper-

the fault that has led to the unpopularity of brine tank cars among fruit shippers.

When the ice is placed in the tanks in large blocks melting takes place very slowly because the ice is in a separate compartment, completely shut off from the hot air that would

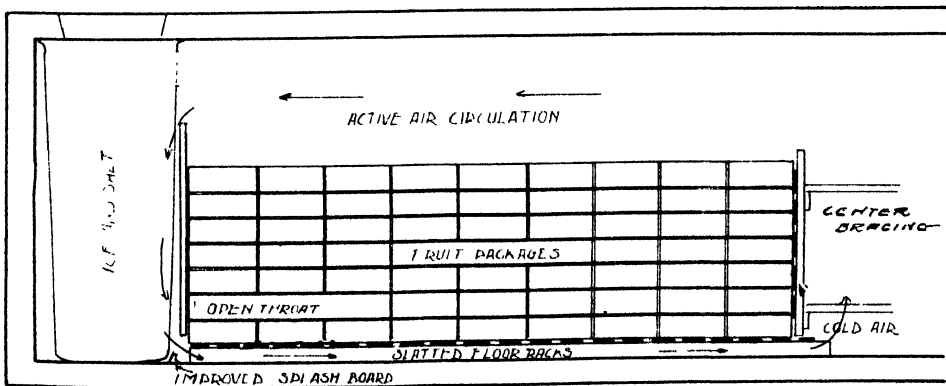


DIAGRAM 3. BRINE TANK REFRIGERATOR CAR LOADED WITH SLATTED FLOOR RACKS AND PROVIDED WITH AN IMPROVED SPLASH BOARD ALLOWING AN OPEN THROAT FOR FREE PASSAGE OF COLD AIR FROM TANK TO CENTRE OF THE CAR

naturally circulate from the warm fruit, melting not taking place till the heat has been transmitted through the iron tanks. It should be more clearly understood that ice has to melt to have its refrigeration made available for the cooling of a refrigerator car in just as real a sense as coal has to burn to make its heat available. The result of such methods of icing the brine tank car gave very high temperatures with a consequent deterioration of the fruit. Thermographs placed in brine tank cars iced in this way show that the temperature seldom goes below 50 degrees F.

end bulkhead as shown in diagram 4. This allowed a free circulation of air about the whole load and resulted in satisfactory temperatures.

Once the car is constructed, so that refrigeration may be conducted to the centre of the car, salt may be applied freely to the ice in order to release the refrigeration quickly,—the colder the air in one part of the car the more active will be the circulation of air to the warmer parts.

The experiments that have taken place prior to the past year are described in Bulletin 48 of the Dairy and Cold Storage series. During the hot season of 1916 the inadequacy

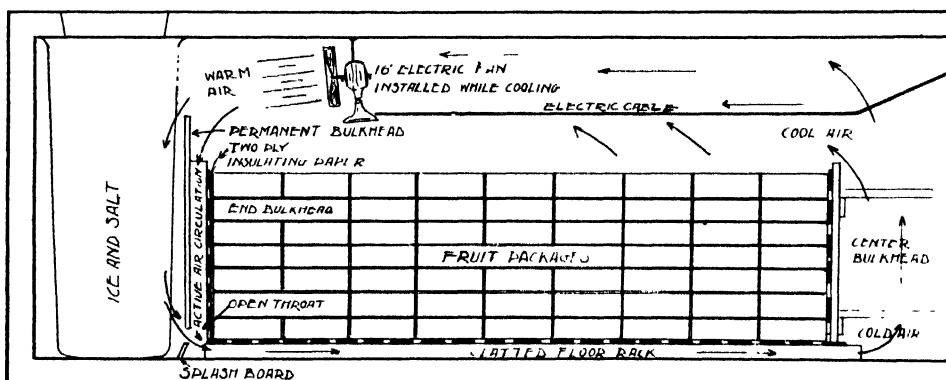


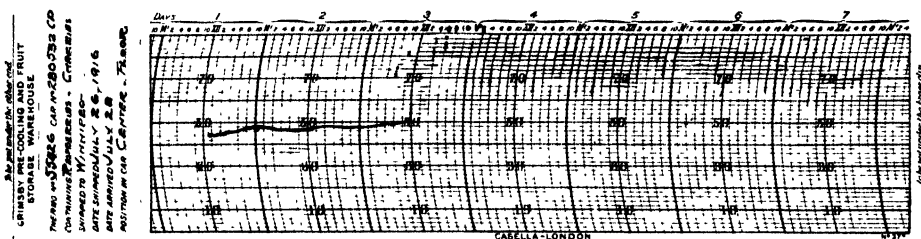
DIAGRAM 4. NEW SYSTEM OF CAR PRECOOLING, USING HEAVY SALT MIXTURES WITH CRUSHED ICE AS THE REFRIGERANT. WHEN AN ELECTRIC FAN IS NOT USED AN INSULATED BULKHEAD NEEDS TO BE PROVIDED

RESULTS DESCRIBED

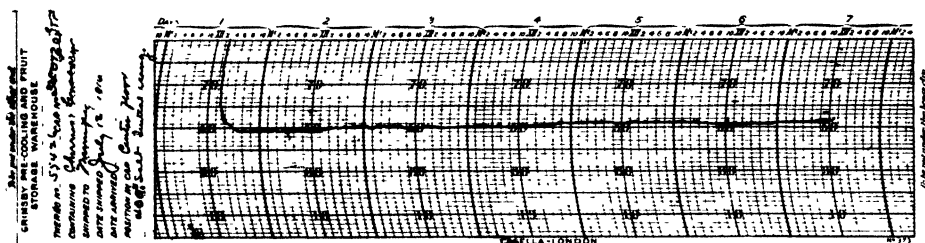
In diagrams 1 and 2 herewith given is shown the result when fruit is loaded in the car. The cold air is dammed up before it can reach the open channel made by the floor racks. The importance of this has been thoroughly demonstrated; heat must travel by convection currents to make rapid progress, and the benefits of floor racks will be lost if they are not rendered efficient at their throats. In diagram 3 is shown the splash board properly located. In making shipments in cars No. 286076 C. P. and 286071 C. P. such a throat was made by ripping up a slat of the floor and installing an

of ordinary refrigerator cars without the use of salt was very apparent. This is well shown in thermograph record 55426, made in an express shipment of raspberries in car No. 280532 C. P. July 26, from Grimsby to Winnipeg. The fruit was precooled to 38 degrees—40 degrees F. and in the two-day shipment the temperature in the centre of the car on the floor rose to 50 degrees F. notwithstanding that the car was under ice the entire way.

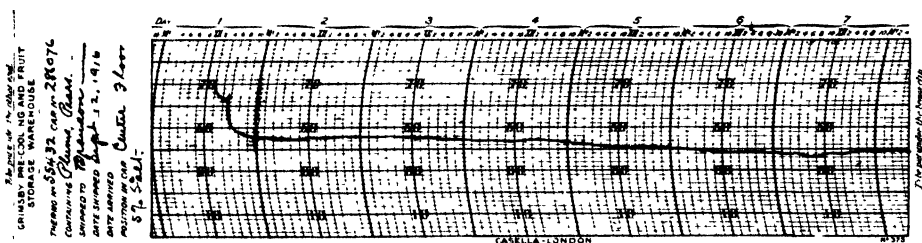
The first brine tank trial made in the season 1916 was with No. 340120 G. T. R., Grimsby to Winnipeg, with sour cherries precooled to 43 degrees F., rock salt to the extent of 400



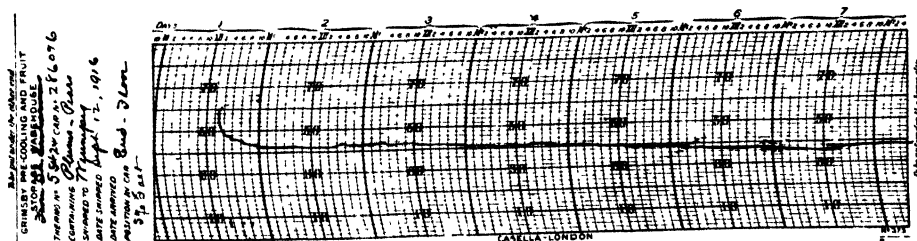
THERMOGRAPH RECORD 55426 MADE IN AN EXPRESS SHIPMENT OF RASPBERRIES FROM GRIMSBY, ONT., TO WINNIPEG, MAN., IN ICED CAR WITHOUT SALT



THERMOGRAPH RECORD MADE IN SHIPMENT OF SOUR CHERRIES PRECOOLED TO 43 DEGREES AND SHIPPED FROM GRIMSBY TO WINNIPEG IN ICED CAR, WITH SALT ADDED PREVIOUS TO SHIPMENT



THERMOGRAPH RECORD MADE ON FLOOR IN END OF CAR NO. 286076 CONTAINING FRUIT PRECOOLED TO 39 DEGREES AND SHIPPED FROM GRIMSBY TO BRANDON, SALT BEING ADDED WITH EACH RE-ICING



THERMOGRAPH RECORD MADE IN CENTRE OF CAR NO. 286076

pounds was added previous to shipment, without instructions to use salt in transit. The temperatures rose to 53 degrees in the centre of the car during the trip, showing that simply adding salt at the initial icing was not adequate. The shipment resulted in a heavy loss.

On Sept. 12 brine tank car No. 286076 C. P. was shipped from Grimsby to Brandon, containing fruit precooled to 39 degrees, with instructions to use 5 per cent salt in re-icing. Records from thermographs placed next to the bunkers and in the centre of the car show gratifying results. No injury from low temperatures occurred and the fruit arrived in splendid condition.

With the two cars, end bulkheads were installed. These allowed a 4-inch space between the fruit and the permanent bulkheads in the car. This allowed a free circulation of air to pass from about the cold brine tanks underneath the false floors to the centre of the car to replace the warm air. Refrigerator cars loaded with fruit should not be shipped with salt mixtures, unless false floors are used, so as to allow the cold air about the bottom of the tanks to flow freely away, and to be replaced by the warm air coming from the fruit, the temperature of which will be reduced in turn. Danger from freezing in the

proximity of the tanks is imminent if efficient false floors are not used.

CONCLUSIONS

Without the use of salt with crushed ice the brine tank refrigerator car is inefficient and unsatisfactory for use with fruit shipments.

The use of 5 per cent salt with crushed ice in conjunction with slatted floor racks has improved the temperature conditions in brine tank cars. With these methods a good brine tank car has given very much more satisfactory results than a poor block-ice car.

Neither freezing nor injury from low temperatures occur with the use of 5 per cent salt with crushed ice when slatted floor racks are used. The floor racks prevent the damming-up of the cold air at the base of the tanks and allow it to flow freely to the centre of the car.

All obstacles blocking the opening between the tanks and the space underneath the floor racks should be removed. Where splash boards permanently block the opening, bulkheads, providing such an opening, should be used.

It is necessary for shippers to closely follow the methods outlined in loading cars and to include in their icing instructions on the bill of lading "Re-ice, using 5 per cent salt with crushed ice."

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE OFFICERS AND EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE WHO HAVE ENLISTED FOR OVERSEAS SERVICE

INSIDE SERVICE

E. F. Steele, Ottawa.

PUBLICATIONS BRANCH

B. Sands, Ottawa.

A. Ackland, Ottawa.

ENTOMOLOGICAL BRANCH

A. E. Kellett, Ottawa.

OUTSIDE SERVICE

Hugh McDonald, Ottawa.

D. W. McCrady, Lacombe, Alta.

Campbell Lindsay, Lacombe, Alta.

CASUALTIES

R. B. Donaldson, Nappan, N.S. (Killed in action).

V. Armstrong, Brandon, Man. (Killed in action).

S. H. Valiant, Brandon, Man. (Killed in action).

In the December, 1916, GAZETTE, a list of men who had enlisted from the various Branches of the Department of Agriculture was published. In that list the name of Eric Fader, Charlottetown, should have been Russell Edison Fader.

THE ENTOMOLOGICAL BRANCH

SOME RESULTS OF SPRAYING EXPERIMENTS IN NOVA SCOTIA IN 1916

BY G. E. SANDERS, FIELD OFFICER IN CHARGE, DOMINION ENTOMOLOGICAL LABORATORY,
ANNAPOLIS ROYAL, N.S.

THE testing of insecticides, begun in 1915, was continued during the season of 1916 at the Laboratory, with the result that the statement often made by orchardists that they, "had sprayed the apples off the trees with lime sulphur" has been proven correct and more easily accomplished than has hitherto been suspected. It is possible that ten per cent of the total crop is not too high an estimate of the quantity of the apples annually removed from the trees in Nova Scotia by the use of too strong lime and sulphur since that material has been introduced as a spray.

In 1915, Mr. G. L. Thomson, of Berwick, N.S., sprayed all of the trees in his orchard for the first, second and third time with 1.008 sp. gr. lime and sulphur and paste (acid) lead arsenate, using the latter in the proportion of two pounds to forty gallons. For the fourth spray he used the same solution on all, but two rows of trees and on these he used a 3-3-40 Bordeaux mixture. All who visited the orchard were struck by the contrast between the two rows and the remainder of the orchard, there being at least three times as many apples per tree on those sprayed for the fourth time with Bordeaux as on the trees sprayed throughout with lime and sulphur. On June 18th and repeated on July 10th of the same year, a number of solutions were

used on small Wagner apple trees in Mr. F. H. Johnson's orchard. Where 1.008 sp. gr. lime and sulphur was used in this orchard practically every apple was removed, whereas the check trees averaged thirty-four apples each. These two tests showed clearly that in many cases lime and sulphur was being used too strong, and tests were arranged in 1916 to determine the maximum strength at which lime and sulphur could be used and also to determine the period at which the apple stems are most susceptible to the injury.

In the spring of 1916 the use of a young Wagner orchard was secured from Mr. F. H. Johnson, of Bridgetown, in order to determine these points. Two trees were used in each plot; homemade lime and sulphur was used in different strengths varying from 1.004 sp. gr. to 1.010 sp. gr. In one series, dry (hydrogen or acid) arsenate of lead was used in the proportion of one pound to forty gallons, and in another series arsenate of lime, testing 44 per cent arsenic oxide, was used in the proportion of three-fourths of one pound to forty gallons.

*Sprays Nos. 2, 3 and 4 were used on the plots to determine the strength at which lime and sulphur could be safely used.

*In referring to sprays by number, Spray 1 means the spray applied when the leaf is the size of a ten cent piece; Spray 2, immediately before the blossoms; Spray 3, immediately after the blossoms, and Spray 4, two weeks after the blossoms.

NUMBER OF APPLES MATURED, PER PAIR OF TREES, WHEN SPRAYED WITH
THE FOLLOWING SOLUTIONS:

	Dry Acid Lead Arsenate, 1 Lb. to 40 Gals.	Arsenate of Lime, $\frac{3}{4}$ Lb. to 40 Gals.
Lime sulphur 1.004 sp. gr.	212	122
" " 1.005 "	86	126
" " 1.006 "	159	125
" " 1.007 "	27	152
" " 1.008 "	33	56
" " 1.009 "	1	44
" " 1.010 "	5	36

Unsprayed trees averaged 277 apples per tree.

The fruit of the Wagner is relatively immune to disease. No difference could be noted in the value of one strength over the other in the control of fungous diseases.

To determine the period at which

the lime and sulphur spray does the greatest harm and also to determine if 4-4-40 Bordeaux has any effect in removing the apples from the trees, and when it causes the most russetting, another series of tests on Wagner trees was arranged. The following were the results:

NUMBER OF APPLES MATURED, PER PAIR OF TREES, WHEN SPRAYED AT
THE FOLLOWING PERIODS:

	Lime Sulphur 1.009 sp. gr. Dry (Acid) Lead Arsenate 1 Lb. to 40 Gals.	Bordeaux 4-4-40 Dry Acid Lead Arsenate, 1 Lb. to 40 Gals.
Immediately before the blossoms only	159	327
Immediately after the blossoms only	108	204
Two weeks after the blossoms only	30	231

The Bordeaux applied immediately after the blossoms russetted 43.6 per cent of the apples, when applied two weeks after the blossoms it russetted only 3 per cent of the apples very slightly, while the Bordeaux applied immediately before the blossoms russetted 7 per cent of the apples.

In connection with the last experiment a most interesting observation was made on the control of Pit

or Pit Rot, the speck so common on smooth-skinned apples in unsprayed orchards in Nova Scotia in 1916. This is probably an arrested stage in the development of the black rot fungus, *Sphaeropsis malorum*.

The following table shows the percentage of apples attacked by pit on the lime and sulphur and Bordeaux trees at the different periods:

	Lime sulphur 1.009 sp. gr. Dry (Acid) Lead Arsenate, 1 Lb. to 40 Gals.	Bordeaux 4-4-40 Dry (Acid) Lead Arsenate, 1 lb-40
Immediately before the blossoms only	13 8	3 63
Immediately after the blossoms only	92	none
Two weeks after the blossoms only.	3 3	none

Unsprayed check tree gave 44.4 per cent of the apples pitted.

After having taken the results from this orchard and considered the cost of the materials and the results obtained, we decided that the most economical spray for 1917 would be lime and sulphur weaker than ever before, for sprays 1, 2 and 3, using arsenate of lime as a poison, and for spray 4 a very weak Bordeaux, using (acid) arsenate of lead as a poison.

About this time it was found that Mr. Wheelock Marshall, of Clarence, had fortunately sprayed his orchard

sprayed throughout with lime and sulphur that did not give from 15 to 50 per cent leaf injury, there was no injury in Mr. Marshall's orchard attributable to spray. Counts of Gravenstein apples in Mr. Marshall's orchard showed them to be 98 per cent free from insect injury and 99 per cent free from apple scab.

Tests of the adhesive qualities of the different sprays were made on sheets of glass by a method that showed the spreading or covering

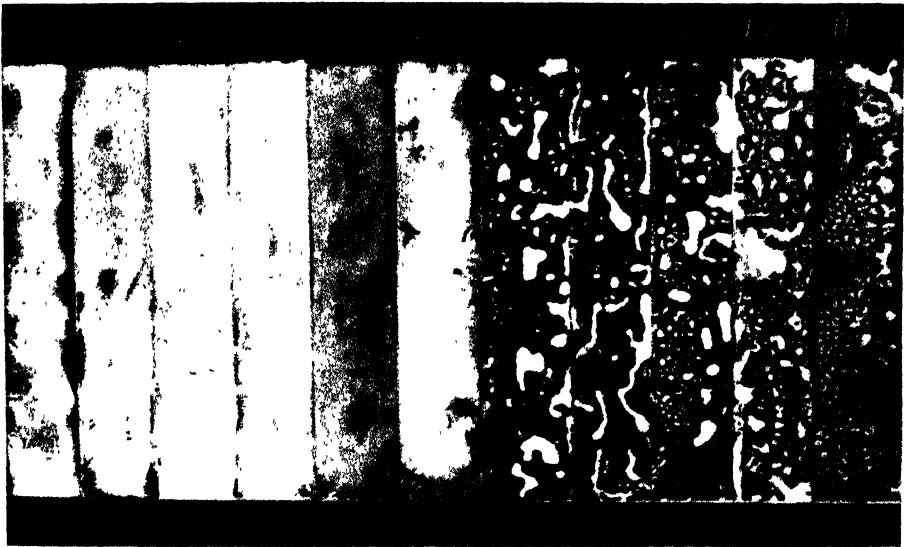


FIG 1 SPRAYING MATERIAL ON GLASS PHOTOGRAPHED ON BEING EXPOSED TO THE WEATHER AT AN ANGLE OF 45 DEGREES

- | | |
|-----------------------------------|--|
| 1. Bordeaux, 4-4-40. | 7. Lime sulphur, 1.009 sp. gr. |
| 2. Bordeaux, arsenate of lime. | 8. Lime sulphur, arsenate of lime. |
| 3. Bordeaux, arsenate of barium. | 9. Lime sulphur, arsenate of barium. |
| 4. Bordeaux, T. P. lead arsenate. | 10. Lime sulphur, T. P. lead arsenate. |
| 5. Bordeaux, acid lead arsenate. | 11. Lime sulphur, acid lead arsenate. |
| 6. Bordeaux, arsenate of soda. | |

in approximately this manner and as a result had almost a perfect crop of apples. Mr. Marshall used 1 to 50, or 1.006 sp. gr. lime and sulphur for spray No. 2, 1 to 60, or 1.005 sp. gr. lime and sulphur for spray No. 3 and a Bordeaux mixture made up of 6 lb. bluestone, 6 lb. of lime to 100 gallons of water, for spray No. 4. Although there was scarcely an orchard in the valley that was

qualities of each spray as well as the adhesive qualities.

Sheets of glass were sprayed with the various combinations of materials, the sprays being applied to each sheet in the same quantity and manner, by means of an atomizer. After drying they were placed in a frame and photographed and then exposed, at an angle of 45 degrees, to the weather. The first photo-

graph, (Figure 1), shows the Bordeaux to be a much better spreader than lime and sulphur, not rolling together in larger drops after being applied as a spray, as is the case with lime and sulphur. The second photograph, (Figure 2), shows the same sheets of glass after having been exposed to the weather for 82 days, or from July 12th to October 2nd, 1916, during which period 8.94 inches of rain fell on the glass. This photograph shows the Bordeaux to be a far better sticker than lime and sulphur, in fact every trace of lime

A method of making Bordeaux was used at the Laboratory during the latter part of the season which eliminates most of the chances of error and makes much less work. The following is the method. Two or three days before needed, make up stock solution, by dissolving a quantity of bluestone, (copper sulphate) in water, using one gallon of water to one pound of bluestone. Supposing a 7-7-100 Bordeaux mixture is required; pour into the spray tank 7 gallons of stock solution to each 100 gallons of spray tank capacity and

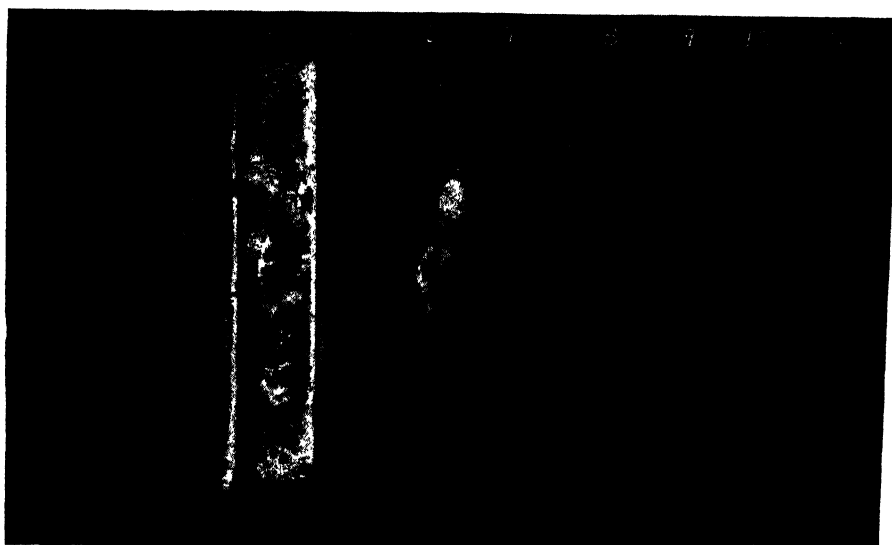


FIG. 2. SPRAYING MATERIAL ON GLASS EXPOSED 82 DAYS DURING WHICH PERIOD 8.94 INCHES OF RAIN FALL

and sulphur had disappeared at the end of 57 days when 7.34 inches of rain had fallen on the glass. Barium tetrasulphide ("B. T. S.") and sodium sulphide ("Soluble Sulphur") were tested alone and with the various poisons. The barium tetrasulphide proved a slightly better spreader than lime and sulphur, and the sodium sulphide proved better than barium tetrasulphide. On the other hand barium tetrasulphide proved less adhesive than lime and sulphur, and the sodium sulphide still less adhesive than the barium, as would be expected from a sodium salt.

fill the tank with water. Then add 7 pounds of commercial hydrated lime to each 100 gallons of water, start the agitator and add the poison. When thoroughly agitated, the spray is ready to apply. Hydrated lime comes in sacks and is a very fine powder which can be kept for four or five months in the open air with practically no deterioration.

The spraying recommendation for Nova Scotia for 1917 will be:—

FIRST SPRAY.—When leaves are size of a ten cent picce, lime sulphur 1.009 sp. gr., powdered arsenate of lime, 2 lbs. to 100 gals.

SECOND SPRAY.—When blossom buds are showing pink. Lime sulphur, 1.007 sp. gr., powdered arsenate of lime, 2 lbs. to 100 gals.

THIRD SPRAY.—When blossoms fall. Lime sulphur 1.006 sp. gr., powdered arsenate of lime, 1½ lbs. to 100 gals.

FOURTH SPRAY.—Ten days to two weeks after the third spray.

First choice of materials: Bordeaux 7-7-100, acid paste lead arsenate, 5 lbs. to 100 gals.

Second choice of materials: Lime sulphur 1.005 sp. gr., powdered arsenate of lime, 1 lb. to 100 gals.

FIFTH SPRAY.—Ten days to two weeks after the fourth. Materials the same as in fourth spray.

The fifth spray is not always absolutely necessary in Nova Scotia.

The writer is indebted to Prof. W. H. Brittain, Provincial Entomologist for Nova Scotia, for valuable assistance and criticism in connection with our spraying problems throughout the season.

THE HEALTH OF ANIMALS BRANCH

HOG CHOLERA

BY GEORGE HILTON, V.S., CHIEF VETERINARY INSPECTOR

THIS serious and very infectious disease of hogs exists to a greater or less extent in all countries where the hog raising industry is encouraged, and although scientists, research workers, and many authorities have devoted time and money in an endeavour to solve the problem of its eradication, it still causes enormous annual losses.

The infection in the majority of outbreaks is unfortunately brought into a district through unknown channels, and the disease is frequently not recognized until an official investigation reveals the true cause. The ordinary activities in urban localities have by this time extended the infected area, and it requires prompt and intelligent action to prevent a further spread of the disease. The Department has, however, been able to keep this malady under control without resorting to reckless destruction, and while it has been necessary to destroy a large number of affected hogs, the loss is insignificant when compared with the immense number of these animals in the Dominion. Figures for the last ten years show that the control of hog cholera in this country has necessitated the slaughter of only eighty-one hogs in

every one hundred thousand. It is, however, necessary to exercise constant vigilance, as outbreaks occur unexpectedly at irregular intervals, and the disease spreads with alarming rapidity if prompt effective action is delayed.

In dealing with such a highly infectious malady it is essential to obtain the co-operation of those whose interests are concerned, as otherwise, the very important secondary factors in the spread of the disease would seriously interfere with control work.

In this connection it is well to point out that it is a very difficult matter to deal with outbreaks in districts where the natural immunity of hogs has been overcome by improper feeding and filthy unsanitary surroundings. Individuals who are content to raise hogs under these conditions are themselves a grave source of danger and require very careful attention. The officers of this Branch, therefore, take all possible steps whenever opportunity offers to impress upon hog owners the importance of cleanliness in relation to disease.

The most serious outbreaks of hog cholera invariably commence in districts where sanitary methods are practically unknown, and, unfortu-

nately, the more intelligent owner has to share to an even greater extent the losses from this disease through the carelessness of his neighbours.

Experience during recent years has shown that hogs fed upon garbage collected in cities, towns and villages readily contract this disease, and on more than one occasion outbreaks have occurred throughout this country almost simultaneously in garbage fed hogs. The Department, therefore, felt justified in passing regulations prohibiting the feeding of garbage to hogs, unless a license for this purpose has first been received from the Veterinary Director General. It is, therefore, illegal for anyone in this country to feed this material until the license referred to has been obtained.

Applications for licenses must be made on the specially prepared official form, which requires that the applicant shall keep his hogs in a clean, sanitary condition; shall not sell them except for immediate slaughter; shall notify the veterinary inspector immediately sickness appears among his hogs, and shall forfeit all claim to compensation in case it is necessary to destroy any of his hogs for hog cholera, unless it is shown that the infection came from some other source than garbage feeding. In the latter case, compensation may be awarded. With a view to destroying any infection in the garbage, the Department insists upon applicants providing suitable facilities for the thorough cooking of this refuse, and in cases where licenses are issued it is not permissible to feed it uncooked.

The feeding of garbage, however, cannot be too strongly discouraged. It is often in a very unsuitable state by the time it reaches the hogs, and even when in the best possible condition it does not produce a good quality of meat, and is a grave source of danger.

CAUSE OF THE DISEASE

It has been definitely determined that the cause of this disease is due to a specific organism. The organism, however, is of such minute proportion that the most modern magnifying lenses of the microscope are not sufficiently powerful to bring it into view. It is quite impossible to have an outbreak of this disease unless this particular germ is present. It may be brought on to the premises where the hogs are kept, in the feed, or carried by people who have been on infected soil, also by rats, mice, birds, or any animal or thing on which infected material can be carried.

SYMPTOMS

It takes from four to eighteen days for a hog to develop symptoms of disease after he has become infected, the length of time depending upon the virulence of the organism and the resisting power of the animal. In the majority of cases, however, especially in districts where the hogs are kept under insanitary conditions, the disease develops very rapidly. The illness is ushered in by an elevation of temperature and the affected hog manifests this disturbance by signs of chills. He will remain concealed in the litter as much as possible, object to being disturbed and will choose a place away from the other hogs whenever he can do so. His appetite is impaired, if not totally absent. It does not take an inexperienced individual very long to appreciate the fact that the hog is very sick. As the disease develops the animal very quickly shows signs of extreme weakness. He will refuse to move and if forced to do so will wobble about and exhibit a picture of extreme misery. The head is carried low and he is unable to squeal in his usual hearty manner. In some cases these symptoms are accompanied by a short, troublesome, husky cough, while in others this symptom may be totally absent, all depending

upon whether or not there are any lesions in the lungs. As each day passes the affected hog shows a marked falling off in flesh. One or two days is sufficient to reduce a well-nourished animal to a state of emaciation. As the disease progresses a discharge is noticed from the eyes. This is at first watery and gradually becomes sticky and gummy and finally purulent. In some cases the eyelids become gummed together.

Owing to the rapid multiplication of the organisms in the blood stream, the blood vessels quickly become extremely engorged. This occurs to such an extent that the blood escapes through the walls on the smaller vessels, and in white hogs can be detected by the red discolouration of the skin. This is seen most frequently behind the ears and the under parts of the body. There may be diarrhoea in some cases, while in others the bowels may be constipated.

These symptoms may vary to a considerable extent, as they depend entirely upon the location of the diseased lesions. In cases where the virulence of the organism is high a hog may exhibit symptoms of weakness and die suddenly, while in other cases, where the hog is possessed of a natural or acquired immunity, he may manifest some or all of the symptoms above-mentioned to a greater or less extent for one or two weeks and finally succumb. A hog may, after exhibiting some of these symptoms, gradually improve and remain in an unthrifty condition for some time and eventually recover. Although these cases are exceptions, they are very dangerous ones, as the infected animal, if the trouble is not diagnosed and the Department not informed, may carry infection for an unlimited period, and be the means of starting very serious outbreaks.

Gases form very rapidly in the carcasses of hogs which die from this disease; the accumulation of these

gases distend the carcasses enormously and give them a very bloated appearance, and in many cases they assume a purple hue. The post-mortem findings may be characteristic, or they may show little or no indication of the cause of death. Hog owners will, therefore, serve their own interests best by immediately wiring the Veterinary Director General or the nearest Veterinary Inspector at any time fatalities occur among their hogs.

During the interval which must necessarily elapse before the inspector arrives no person or animal should be permitted to enter the hog pens. It is most important that the hogs should be isolated from all other forms of life as far as practicable. Any dogs on the premises should be securely chained, and the poultry should be penned up. This action, if carefully followed, will curtail the infected area to a very material extent.

THE POLICY OF THE DEPARTMENT

The policy followed by the Department in dealing with outbreaks of this disease is to slaughter all affected hogs paying compensation therefor, and the serum treatment of all exposed apparently healthy ones. This work is done free of charge, but the Department does not assume any responsibility in case any of the treated hogs die.

No compensation can be paid under the provisions of the Animal Contagious Diseases Act for animals which die from hog cholera or any other disease requiring compulsory slaughter.

The treatment of exposed hogs with serum produces a limited immunity for a short period, and in cases where the disease has not already developed will protect the hog for a long enough period to enable the owner to fatten him for the block. As, however, it is not always possible to determine whether or not some of these hogs may have a

mild attack of this malady, they are kept in close quarantine and slaughtered, when fit, under official supervision.

The success of this treatment depends largely upon the selection of suitable hogs. If hogs with normal temperatures are the only ones chosen few, if any, deaths will occur among them.

The slaughter of affected hogs only and the treatment of exposed ones has enabled the Department to conserve for food purposes a large number of hogs, which, under the older policy, would have been lost, and this procedure has not in any way lessened the effective control of this malady. The owner is now able to realize more for his hogs after they have been fattened than was possible by prompt slaughter, the burning of the carcasses and the payment of compensation. An estimate of the number of treated hogs throughout this country shows that there has been a saving to the Department alone of many thousands of dollars through the reduction of compensation claims.

Infected premises require thorough disinfection as soon as the diseased hogs have been slaughtered and their carcasses satisfactorily burned or buried. This should be repeated

directly the serum treated hogs have been destroyed.

It would be well for hog owners to remember that the hog cholera regulations prohibit the bringing of hogs on to quarantined premises for three months after the affected animals have been destroyed and the premises satisfactorily disinfected. The owner is just as liable to prosecution for bringing hogs on to a quarantined premises as he is for taking any off. This provision was found necessary, as the early restocking of hogs on premises which have been infected frequently results in new outbreaks of the disease.

In view of the great importance of preserving to the utmost extent our hog industry, it is essential that all hog owners co-operate fully with the Department.

The Animal Contagious Diseases Act requires that owners notify the Veterinary Director General or the nearest Veterinary Inspector immediately they suspect the existence of this disease, and failure to do so is punishable under this Act. Prompt notification directly reasonable grounds for suspicion exist will save the owner money, and materially assist the Department in controlling an outbreak with the least possible loss to a community.

THE SEED BRANCH

FIELD ROOT AND VEGETABLE SEED GROWING IN THE MARITIME PROVINCES

BY S. J. MOORE, MARITIME REPRESENTATIVE

PREVIOUS to 1913 the farmers of the Maritime Provinces, in common with Canadian farmers generally, depended for their supplies of field root and vegetable seeds on the seedsmen who had European countries as sources of supply. In that year Dominion subventions amounting to about one-eighth of the retail prices were offered on home-grown seeds, subject to inspection

by officers of the Seed Branch. This encouragement was given to Canadian seed because of the excellent results obtained by farmers and experiment stations in comparison with the ordinary seed sold by the trade. For example, the writer has seen two varieties of turnips and two or more varieties of swedes growing in one field sown with commercial seed of a named variety.

Prior to the offering of subventions a number of farmers in Yarmouth county, N.S., and a few in Prince county, P.E.I., were growing swede seed in a small way and selling it to their neighbours at 40 and 50 cents per lb. The output did not increase because the demand was limited at the above prices, and wholesale seedsmen were offering the growers only one-quarter as much. But on the outbreak of war the Seed Branch, fearing a scarcity of these seeds owing to curtailed production in the war zone, made a special effort to encourage production at home. In the Maritime Provinces the increase is principally in swede and cabbage seed. There are six growers in Prince Edward Island, seventeen in Nova Scotia and two in New Brunswick, each growing from 30 to 275 lb. of swede seed; and four are growing cabbage seed in quantity. In addition to these a large and increasing number of farmers are growing enough seed for their own use. The amount for sale this year will aggregate about 3,000 lb., which is quite small when we consider that Nova Scotia alone requires 20,000 lb. of swede seed annually. But without the home-grown seed, there would have been a shortage in this province last year.

The growing of mangel, beet, parsnip and carrot seed does not promise so well and will probably be confined to farmers and gardeners growing small quantities for their own use. Seed growing from the tender vegetables is uncertain in this climate. In the case of turnip, swede and cabbage, however, the Maritime Provinces could grow enough seed for all Canada. But farmers who have been paying the seedsmen from 25 to 60 cents per pound are loath to take their contracts for growing better seed at 15 cents. This difficulty might be overcome by the seedsmen raising the price for home-grown seed both ways and selling under guarantee. We know of many farmers who will

pay almost any price for seed with a guarantee behind it, and seedsmen offering such seed would in a short time command the trade. Two pounds of good swede seed per acre will ensure a full stand of plants, which is the first requirement for a maximum yield.

Some of the essentials for a satisfactory crop of swede or turnip seed might be of interest. The soil should be a sandy loam, well-drained, well-fertilized, and properly cultivated. The plants require a moist soil but not a wet one. More failures are due to improper drainage than any other cause. I have seen good results from ridging as is done with potatoes.

The selection of parent stock should include well-formed, medium-sized roots not more than three pounds in weight, with the size as even as possible. Some of the best growers claim that large roots as parent stock are much more likely to produce sterile plants. Those growing swede seed on a large scale should sow their stock seed in late July or early August, thin or single to about three inches, and store all sound roots in either pit or cellar, thus having less bulk and less liability to rot than from the use of more mature roots.

Plants two feet apart in rows three feet apart is the best spacing on rich soil, but the former should be reduced to eighteen inches on soil only medium in fertility. The aim is to have a growth that will fill all the space, yet not so thick as to prevent the proper development of each plant. Filling of the space prevents the growth of weeds after the plants are too large to cultivate, ensures even ripening, and enables the plants to support each other during wind storms. Plants set from three to three and a half feet each way invariably suffer from wind and ripen unevenly, while those placed too close produce small seed of inferior quality.

PART II

Provincial Departments of Agriculture

IRRIGATION RESULTS IN 1916

MACDONALD COLLEGE

BY W. J. TAWSE, B.S.A., ASSISTANT IN HORTICULTURE

THE Horticultural Department now has six acres under the low over-head Skinner irrigation system. It is the aim of the department to test the value of irrigation on different crops for a number of years. The experiments were extended last year to include nursery stock, but owing to the heavy rainfall distributed over each month the results were not sufficient to give any definite conclusions. In the final results obtained on certain crops the difference in yield was sufficient to prove that irrigation was the one factor responsible for the increased

yields.

A brief review of the amount of precipitation for the four months in which irrigation is needed proves interesting. It gives a clearer reason for the incomplete results obtained in our experiments this past season. The following table giving the total precipitation for the past three seasons for the months of June, July, August and September, show, with the exception of one month, that the amount of precipitation was very much heavier than for the past three years:

TABLE OF PRECIPITATION FOR 1914-'15-'16

	June	July	August	September
1914	2 85	1 50	3 99	2 59
1915	2 32	1 82	3 46	1 79
1916	5 40	2 22	2 51	3 03

The precipitation for June of last year was nearly double that of the two years preceeding, and was distributed throughout the month. The temperature did not exceed 79 degrees as a maximum, and the weather was only partly clear.

The weather for the month of July was clearer and a much higher temperature prevailed throughout the entire month. The irrigation system

was used this month on strawberries and early vegetables, but the heavy precipitation just after using it made the results uncertain.

The month of August was somewhat cooler than July and the high temperature from the 16th to the 22nd was counteracted by heavy thunder showers. The irrigation was used freely this month and the results were more definite.

September was cooler than in either of the two years preceeding. The mean maximum reaching only 68 degrees. The weather was cloudy and the continued showers made the use of irrigation unnecessary.

The experiments with strawberries were not conclusive, and the results negative due to the unsatisfactory weather conditions following the use of the irrigation.

The crop of onions under irrigation yielded one-third more in bushels per acre than the check plot without irrigation. This is the only crop which yielded definite results showing the value of irrigation.

The experiments with the crop of carrots gave good results in producing

an early market crop; but the final digging gave no definite results. The crop was heavy, very large and only fair quality due to the moist fall.

The irrigation produced promising results in forcing the celery into growth very rapidly after transplanting to the field. The crop was favoured by showers and cool weather later, which made the results as to the influence of irrigation on the total yield uncertain.

In conclusion, I cannot say the experiments with the exception of one crop were not a success. The total yields on both the irrigated and non-irrigated sections were so similar, that we cannot say the results obtained are favourable for irrigation during the past season.

ONTARIO HORTICULTURAL EXPERIMENT STATION, VINELAND

BY E. F. PALMER, B.S.A., DIRECTOR

DURING the past season increased yields of vegetables and raspberries have been secured by the use of the Skinner irrigation system. Strawberries and early vegetables were irrigated but little owing to the extreme wet weather during May and June. The system was found to be of the greatest advantage last season in saving the raspberry crop, and in starting catch or second crops such as lettuce, late beets, cabbage and cauliflower.

The irrigated section comprises slightly over three acres in three ranges with adjoining check plots. Pipes are fifty feet apart with nozzles every four feet. The water supply is secured from Lake Ontario by a gasoline engine pumping direct into the irrigation main. This system gives good satisfaction and one and one-half acres can be watered at a time requiring about seven hours to apply an acre inch of water, at a maximum cost of \$3.60 per acre.

Much of the value of irrigation depends on the type of soil, as irriga-

tion is not, in many cases, the only thing needed to insure a full or increased crop. A loose, open soil, either sandy loam, or of the black muck loam type, with an open sub-soil, is the ideal soil for irrigation. A heavy, compact, clay soil will not respond unless cultivation is greatly increased. The soil on the Station irrigation block ranges from a moderate sandy loam to a heavy clay. Strawberries and asparagus occupy the lighter soils, raspberries and vegetables, the heavier soils. The whole plot is well manured and cultivated and treated as uniformly as possible, so that the differences due to irrigation will be correctly interpreted.

Water is applied during dry weather, once every week or ten days, about an inch at a time depending on the amount of rainfall registered since the last irrigation. Calm days are preferred for irrigating. Bright sunshine while the water is being applied does not cause any apparent injury in this district, though dull days or late evening

are desirable when applying the water.

The comparative yields of a few of the different crops tested are given below together with the amount of water applied, the amount of rainfall per month, type of soil and other particulars.

RASPBERRIES

Soil type: medium heavy loam.

Yield per acre, irrigated: 3124.7 qts.

Yield per acre, non-irrigated: 1988.43 "

Gain per acre from irrigating: 1136.3 "

The total amount of water applied during July and August was 6.8

Yield per acre, non-irrigated plot: 1647 "
Gain in lb. per acre for irrigating: 431 "
Cutting season lasted from May 5th to June 19th, a total of 44 days.

No irrigating was done during the cutting season and as the increased yield was due to the water applied during the growing season of 1915, this will have to be considered.

During June and July, 1915, .9 inches of water were applied at a cost of \$35.64 per acre. The total rainfall during summer of 1915 was 13.27 inches.

The increased profit in this case is not large. Possibly the same increase could be obtained by much



SKINNER IRRIGATION SYSTEM AT THE HORTICULTURAL EXPERIMENT STATION, VINELAND, ONTARIO

Strawberries in foreground, asparagus in left background

inches. This, at a cost of \$3.60 per acre inch, equals \$24.48, or about one-fifth of the value of the increased yield. The rainfall during July and August, our two driest months, amounted to 1.72 inches.

Some objections to be noted in the irrigation of raspberries are that some of the berries are inclined to be soft, and that the canes make a too heavy growth of soft wood, making the use of supporting wires almost a necessity.

ASPARAGUS

Soil type: sandy loam.

Age of plantation: three years.

Yield per acre on irrigated plot: 2078 lb.

less water. A bigger difference may be looked for next season, owing first, to the increased age of the plantation, and second, to the extreme dryness of the past summer, which will have its effect in next season's crop on the non-irrigated plot.

ONIONS

Soil type: medium deep, sandy loam.

These onions were transplanted out May 9th, harvested October 12th. Variety: Prizetaker.

Yield per acre on irrigated plot: 477.9 bus

Yield per acre on non-irrigated plot:..... 400 "

Gain in bus. per acre from irrigation: .. 77.9 "

This, at \$2.00 per bushel, equals \$155.80 as increased returns from irrigating.

During July, August and September, 8.7 inches of water were applied at a cost of \$31.39, leaving \$124.41 as net increased profit per acre from irrigating.

Total amount of rainfall during season was 12.5 inches. A total water available (rain and irrigation) of 21.2 inches.

BEETS AND CARROTS

Soil type: heavy clay loam.

The seed was sown by May 1st in drills 16 inches apart. This seed was produced at the Station in 1915, and gave a good stand of plants. All were thinned uniformly to from 2 inches to 3 inches apart in the row. The roots were taken up on July 25th and records taken, total length of growing season being 86 days.

BEETS

Yield per acre on irrigated plot:	111 bus.
Yield per acre on non-irrigated plot:	71 "
Gain per acre from irrigating.	40 "

CARROTS

Yield per acre on irrigated plot:	190 "
Yield per acre on non-irrigated plot:	117.7 "
Gain per acre from irrigating:	72.3 "

Amount of water applied during July, the only dry month during the growing season, was 2.9 inches, at cost of \$10.44 per acre.

The value of the increased yields amounted to \$40 for beets, and \$72 for carrots. This would give an increased profit per acre of \$29.56 for the beets and \$61.56 for the carrots for irrigating. (Cost of irrigation deducted).

The total rainfall during this time amounted to 10.1 inches. During a normal, or a drier season, more irrigating would have to be done, but the increased yield would be proportionately higher, though also the total, or actual cost, of producing the crop would be higher.

THE ONTARIO AGRICULTURAL COLLEGE

BY J. W. CROW, PROFESSOR OF HORTICULTURE

WE had no definite experiments laid out in 1916 to test this matter, but are nevertheless able to report excellent results from the application of water. Our best result was with celery, our crop being considerably heavier than in 1915, and quite up to normal. That this may be credited to irri-

gation goes without saying, as our soil is a heavy clay loam with gravel underneath, and our crop would have been a failure without artificial irrigation. We have been using the Skinner overhead irrigation for some years, and would not care to undertake vegetable gardening and strawberry growing without its aid.

"The secret of thriving is thrift; saving of force: to get as much work as possible done with the least expenditure of power, the least jar and obstruction, the least wear and tear. And the secret of thrift is knowledge. In proportion as you know the laws and nature of a subject, you will be able to work at it easily, surely, rapidly, successfully, instead of wasting your money or your energies in mistaken schemes, irregular efforts, which end in disappointment."—*Charles Kingsley*.

THE POTATO CROP OF 1916

SCHOOL OF AGRICULTURE, STE. ANNE-DE LA POCATIÈRE

BY H. BOIS

THE potato crop was much below the average, this year, chiefly on account of the drought at the end of July and during the month of August. In spite of the lack of rain, however, some farmers secured yields of two hundred and fifty bushels per acre. They owe their success to the following method: these progressive farmers never grow potatoes several years in succession on the same field; they always grow them on a pasture or clover sod, rich in organic matter, which stores water and keeps it for the use of the plant.

In planting, whole tubers of average size appear to have given the best results; large sets with three good eyes also do very well.

Planting in rows thirty inches apart, with the sets at least twelve inches apart, has given far better results than planting at eighteen and

seven inches apart. The largest yields have been obtained from potatoes planted in hills thirty inches apart, each way. In such plantations, cultivation may be given both ways. Weeds are more effectively destroyed and there is less evaporation of moisture from the soil.

The potato bug caused great damage last summer and spraying has been neglected owing to the fact that Paris green was scarce, and very expensive. The most efficient spraying solution is the following: lead arsenate, two pounds; Paris green, one half pound, the whole diluted in forty gallons of water. This mixture does not kill the potato bug as quickly perhaps, as some others, but on account of its strong adherence to the leaves, it kills them more surely, if more slowly.

ONTARIO HORTICULTURAL EXPERIMENTAL STATION

NORTHERN VS. SOUTHERN GROWN POTATOES FOR USE AS SEED TUBERS

BY E. F. PALMER, B.S.A., DIRECTOR

WITH a view to determining the relative productivity of Northern immature seed tubers in comparison with ordinary seed tubers produced in the Southern part of the province, the following experiment was conducted during the past season.

Seed tubers (of the Early Eureka variety), secured from Kenora, Dryden, Monteith and Port Hope, were cut and planted on May 1st as follows:

Rows 1 and 2. Mature seed from Kenora.
Rows 3 and 4. Immature seed from Dryden.
Rows 5 and 6. Immature seed from Monteith.
Rows 7 to 10. Mature seed from Port Hope.

The experiment was conducted in duplicate. The soil was a rather heavy clay loam. The whole plot was sprayed three times during the season with Bordeaux and Arsenate of Lead.

The Northern grown seed matured

approximately a week earlier than the Southern seed, but none of the tubers were dug until July 31st, when the best sixty hills in each plot were selected and carefully weighed, giving the following results:

Mature seed from Kenora, 60 hills, gave 74.8 lb.

Immature seed from Dryden, 60 hills, gave 87.4 lb.

Immature seed from Monteith, 60 hills, gave 68.6 lb.

Matured seed from Port Hope, 60 hills, gave 44.1 lb.

The immature seed from Dryden was grown for only one year in the North, and the seed from Monteith for two years.

The weights, as given above,

indicate that it would be a profitable investment to secure Northern grown tubers every season for use as seed, as even one season in the North seems to be enough to insure good seed for early potatoes, and, furthermore, they mature their crop earlier. The above results, however, should not be taken as conclusive in any way. The work in the past season was undertaken more to indicate whether the experiment was worth while, and if so, the best methods and outlines for future experimenting. For the coming season, it is planned to continue and expand the experiment, on more suitable location and soil.

The Board of Agriculture and Fisheries for the United Kingdom has recently published Part I of Volume fifty-one, which gives the acreage and Live Stock returns for England and Wales. Under the heading "Area under Cultivation," the report has the following: "Of the total area of land in England and Wales, 37,137,564 acres, 11,051,101 acres were returned as arable land, 16,022,983 acres as permanent grass, and 3,816,083 acres as mountain and heath land used for grazing in 1916. These show an increase of 85,394 acres of arable land, a decrease of 64,410 acres of permanent grass, while rough grazings increased by 51,377 acres. The increase in the cultivated area, which amounted to 20,984 acres, occurred principally in the south-western division of England and Wales."

NEW BRUNSWICK

LAND SETTLEMENT SCHEME AFTER THE WAR

BY J. B. DAGGETT, SECRETARY FOR AGRICULTURE

THE Government of the province of New Brunswick has decided upon a plan for land settlement after the war. After deciding upon the plan the Government established an Advisory Settlement Board, which examined the country, looking for the most suitable districts for settlement. A large amount of suitable land was found to exist in favourable localities.

The land settlement plan involves the establishment of community settlements, each community to accommodate from one hundred to two hundred and fifty families, depending on the size of the area of suitable land that is available in each locality. Each of these communities will radiate from a central farm operated by the Government for the purpose of supplying instruction, employment, necessary implements and teams for the new settlers.

On this central farm provision is going to be made for a school, church, butter and cheese factory, blacksmith's shop, post-office and other public conveniences, and the co-operative principle will be applied in the marketing and, indeed, in many other departments of the communal life and work. While the communities will, as far as possible, each consist of members of the same religious creed, it is thought that the various Protestant denominations might manage to combine in a form of worship, which would occupy the one church.

The size of the holdings available for each settler will range from 10 to

100 acres. Part of each lot will be cleared and cultivated and a cheap, but comfortable set of buildings erected, sufficient for the needs of the settler for a number of years. Ultimately he will build a larger and more permanent home, perhaps incorporating in it this temporary dwelling. Fences are to be erected, and a water supply provided. Each settlement also lies close along a railway line, so that nobody will feel too remote or lonely. That has been the cause of many colonization failures in the past.

The holdings will vary in price from \$700 to \$1,200, and about five per cent will be paid down in cash, and the rest distributed over, perhaps, 20 annual instalments. The New Brunswick Government is prepared to administer the settler's capital in his own best interest. Suppose a soldier-settler receives a sum of \$1,000 in commutation of his pension. He will have to pay down perhaps 5 per cent in cash for his holding. The balance of his capital the Government is willing to take over, allowing him 3 per cent, and directing its expenditure. It is believed that this plan will save a man from himself and his money from being wasted.

The province is admirably adapted for the growing of apples and potatoes, and for all crops involved in mixed farming, including dairying, the growing of cereals, sheep raising, swine raising and poultry keeping. Instruction will be given in all of these branches of industry and the settlers encouraged to take them up.

QUEBEC

AGRICULTURAL LEGISLATION

DURING the 1916 session of the Quebec parliament, the only Act passed regarding agriculture was, "An Act to Amend the Revised Statutes, 1909, relating to the manufacture of Dairy Products".

The amendments are as follows:

1. Article 2031*b* of the Revised Statutes, 1909, as enacted by the act 1 George V (1st session), chapter 16, section 1, and amended by the act 5 George V, chapter 31, section 9, is again amended:

(a) By replacing paragraph 2 thereof by the following:

"2. The words 'butter factory' mean any establishment to which milk or cream from cows of herds belonging to at least three persons, is brought, either for sale in its natural state as one or the other, or

to be converted into butter, wholly or partly, in such establishment or elsewhere."

(b) By striking out the word "cheddar" in the third line of paragraph 3 thereof.

2. Article 2031*d* of the Revised Statutes 1909, as enacted by the act 1 George V (1st session), chapter 16, section 1, is amended by striking out the words: "approved by the board of directors or the executive committee of the Dairy Association of the Province of Quebec," in the third and fourth lines of the second paragraph thereof.

APPROPRIATIONS FOR AGRICULTURE

The appropriations for agriculture for the fiscal year ending 30th June, 1918, are:

Civil Government	\$ 46,500
Agricultural Societies	100,000
Farmers' Clubs, encouragement of agriculture in general, including subsidy to the South Shore Railway Company, under 63 Vict., Cap. 2; land clearing competitions, etc	100,000
The Agricultural and Horticultural Society of Montreal	500
Pomological and Fruit Growing Society of the Province of Quebec	500
Horticultural Society of Quebec	500
Council of Agriculture	3,000
Agricultural Schools	30,000
Veterinary Instruction	5,500
House-keeping Schools (Ecoles Ménagères)	10,000
Dairy Association of the Province of Quebec	2,000
Dairy School of St. Hyacinthe, and working of farm	10,000
Inspection of Factories for the manufacture of dairy products	60,000
To encourage the Dairy Industry in general	27,000
Encouragement of the Cultivation of Fruit trees (Horticulture)	5,000
Official Laboratory of the Province of Quebec	2,000
Lectures on Agriculture	9,000
Journal of Agriculture	27,000
Encouragement to Poultry Raising	3,000
Provincial Agricultural Merit	3,500
Arbor Day	100
Exhibitions	30,000
Total	\$475,100

SUPPLEMENTARY ESTIMATES

The supplementary estimates for the year ending June 30th, 1917, are:—

Agricultural Societies	15,000
Inspection of Factories for the manufacture of dairy products	20,000
Total	\$35,000

THE COMMITTEE ON AGRICULTURE

THE Committee on Agriculture of the Legislative Assembly of Quebec held three important meetings during the session. These meetings were called for the purpose of discussing the problems connected with the high cost of living and possible remedies. Those heard by the committee included representatives of the Montreal and Quebec Boards of Trade; the Trades and Labour Council of Montreal; Macdonald College; the Quebec Cheesemakers' Co-operative Society; the Oka Agricultural Institute; School of Agriculture, Ste.-Anne-de-la-Pocatière; the Dairy School at St. Hyacinthe and the Quebec Department of Agriculture.

The following resolution was passed and submitted to the Legislative Assembly:

"Your Committee after hearing the views of a number of persons representing agricultural teaching institutions, public organizations, commerce, industry, trades and agriculture, on the causes of the high cost of living and the remedies for the same, recommends the adoption of immediate steps to ensure the following:

1. To check as rapidly as possible the spread of tuberculosis among cattle.
2. To have cold storage warehouses inspected regularly.
3. To prohibit the exportation of natural fertilizers.
4. To request railway companies to

grant if possible a lower rate for the transportation of agricultural machinery, agricultural produce, natural and chemical fertilizers, as well as feed for live stock.

5. To find some means of purchasing at easier terms agricultural machines, corn, and other feed necessary for the feeding of stock.

6. To keep for the farm all the labour which farmers now have and which is absolutely necessary to keep up agricultural production.

7. To increase subsidies to agriculture by taking money for this purpose from the new sources of revenue to as large an extent as possible.

8. To establish a system of agricultural credit so as to enable the farmers to secure without difficulty the money which they require to make necessary improvements.

9. To enlarge the distribution of pure-bred cattle for breeding purposes.

10. To encourage as much as possible the establishment and success of canning factories in the province.

"Your committee also recommends that an active campaign of education be started as soon as possible to carry out the following programme:

1. To practice the most rigid economy in the expenditure on food and clothing.
2. To advise farmers not to export cattle or surplus feed, but to make use of the same to increase their herds.
3. To warn the consumers against the consumption of very young animals of all sorts, lambs, fowls, etc., which might be made to increase in weight with several months of feeding.
4. To encourage the establishment of co-operative societies in order to bring the producer and the consumer in as direct contact as possible.

THE INSPECTION OF NURSERIES

BY GEORGES MAHEUX, B.A., I.F., ENTOMOLOGIST

THE legislation concerning the inspection of nurseries was sanctioned on February 19th, 1914. Up to that time there had been no restriction to the trade of fruit trees for planting. However,

since 1912, the Department of Agriculture employed an entomologist who was instructed, among other work, to visit the commercial nurseries and other plantations during the summer. This inspector was

not supposed to apply a law which was not, as yet, in existence, but simply to note the presence of injurious insects, of diseases and to teach the nurseryman the best methods of destroying these insects. This inspection had therefore three objects: to help the nurseryman, to make a field study of economic-entomology, to ascertain exactly the species of the chief parasites and the extent to which young trees were infested before drafting a law on the subject.

When, therefore, the Minister of Agriculture introduced, in 1914, the law called "Law for the protection of plants," all doubts as to the law being efficient had been already removed, as the entomologist had been enabled, by his work, to prepare a blacklist; this list was composed, at first, of all the injurious insects and diseases, the presence of which had been noted *de visu* and the invasion of which was the most to be feared. This list, however, may be added to or shortened from time to time, according to the circumstances.

The law, as promulgated, defines the official position of the entomologist, gives him authority over the whole province and defines the scope of his powers. The private individual who, heretofore, had been free to admit this officer, or refuse him access to his premises, must henceforth not only receive him, but also help him in his work. The law says:

"2041e. It is forbidden to resist, in any manner, the action of the entomologist, his assistant, or representative, when acting in accordance with this section.

"2041d. Upon the production of a document stating his official capacity, the entomologist of the Department of Agriculture of the province, or his assistant or representative, shall have the right to enter any nursery, orchard or other premises wherein there is reason to believe that there are plants of any kind."

These two articles clearly show the right of the entomologist to visit

any place when judged necessary, and the duties of the occupants. But, in spite of this legislation providing for the inspection of all infested nurseries, it was impossible for the entomologist to cover adequately the whole province. How could he, single-handed, discover all the places requiring his intervention? This is provided for by the law which compels the owner to notify the Minister when his plants are attacked by pests.

"2041g. The owner or occupant of any lot of land or nursery where the existence of any of the insects or diseases hereinafter specified may be ascertained or suspected, shall forthwith inform the Minister thereof, and at the same time give all useful information respecting the spread of the pest."

The blacklist includes the following:

San Jose scale, *Aspidiotus perniciosus* Comst.

Brown tail moth, *Euproctis chrysorrhoea* L.

Gipsy moth, *Porthetria dispar* L.

Woolly aphis, *Schizoneura lanigera* Hausm.

Black knot, *Plowrightia morbosa* Sacc.

Apple tree canker, *Nectria ditissima* Tul.

Potato canker, *Chrysophlyctis endobiotica* Schill.

By the other articles, the law also provides for an inspection, by the entomologist, from the 15th of June to the 15th of September of all nurseries worked on a commercial scale; the entomologist must destroy all infected plants or parts of plants, give the owners instructions for the treatment of diseases and see that this treatment is applied (the nurseryman being compelled by law to follow these instructions), to issue certificates authorizing the sale of inspected plants, if judged advisable. If, owing to the seriousness of the nature of the disease observed, the entomologist cannot grant this certificate, no plant or part of a plant may be sold, delivered or disposed of before the next inspection.

ORGANIZATION

The entomologist not only has to administer the law, but also to explain it. This is the most important part of his work, but not the only one. He has an office at the Horticultural Division. His work, when the inspection is over, consists chiefly in spreading among the farmers and apple growers, elementary knowledge in entomology and teaching the best methods of control. It may well be believed that this work requires a large amount of writing and correspondence in order to be efficient. To warn the people against injurious pests, the entomologist must constantly send articles to the newspapers and periodicals reaching the interested parties: agricultural papers, farmers' magazines, daily or weekly city newspapers; he writes or has prepared bulletins or circulars that are distributed in large numbers among the agricultural class. Among other bulletins published on this subject, the following should be mentioned:

No. 16. "Le guide de l'arboriculteur," J. H. Lavoie, I.F.

No. 17. "La culture fruitière dans la province de Québec," Rev. Br. Léopold.

No. 21. Pour avoir de belles pommes," Firmin Létourneau, B.S.A.

No. 23. "Principales espèces d'insectes nuisibles et de maladies végétales," Révérend V. A. Huard, canon.

The instructors of the Horticultural Division are also continually at the disposal of those who desire to have demonstrations on the preparation of insecticides and fungicides and their use. It should be stated also that the entomologist and other lecturers have to deal with the subject of the protection of plants at the agricultural courses that are given throughout the province each year.

ADMINISTRATION

As required by the law, the

entomologist spends the summer season making a thorough examination of all commercial nurseries. There are eight large nurseries in the province supplying plants to a rather large district and some twenty fruit stations, each having a small or average nursery to supply the farmers, who are desirous of establishing an orchard.

Large or small, each nursery must undergo a very thorough inspection for each row and each species of tree. The entomologist calls the attention of the owner to all the injurious insects that are met with, and points out the preventive remedies or the means of control. If such insects or diseases are classed as dangerous by the law, the inspector must have them destroyed under his supervision, and if the pest is very common, he does not leave the place before he is practically sure that the plants are clean. He makes a note of the insects seen, gathers a few specimens, inquires as to sprayings (number, date, composition), then he delivers, if advisable, a certificate of inspection good for a year.

RESULTS

Anyone who has had an opportunity of seeing the orchards recently planted in the province cannot fail to be convinced of the good effects derived from the administration of this law. Everywhere, the trees are in good condition, they are hardy and the quantity of parasites is reduced to a minimum. In a general way it may be stated that in a given point injurious insects are in inverse ratio to the sprayings. Owing to the continual interest that is taken in this important question of plant protection by the Honourable Minister of Agriculture, it may be hoped that it will take a much greater extension. The results obtained so far are very satisfactory, and very promising for the future.

LOUIS HÉBERT

THE accompanying reproduction represents the "Louis Hébert Monument", which is to be erected next year on the promontory of Quebec, opposite the Quebec City Hall, on a parcel of the ground which was cleared and cultivated three centuries ago by this first farmer settler. As pointed out on page 518 of the June, 1916, issue of THE AGRICULTURAL GAZETTE, Louis Hébert, the first farmer, with his wife, Marie Rollet, his son Guillaume and his daughters Anne and Guillemette, landed in Quebec in 1617 and at once started to clear the soil which is now occupied by the Cathedral and the Seminary of Quebec. The example of Louis Hébert was followed by Guillaume Couillard, his son-in-law, who also sowed and cropped on seven acres of land, wheat, peas and other grains. It can be seen from this photograph that the Hébert Monument will be a real work of art, fully worthy of the subject which it represents. Hébert is seen in his field as he begins to harvest. In an attitude of prayer and gratefulness, he offers the Creator his first sheaf of wheat and the whole of his crop. At the foot of the pedestal to the right, is seen the wife of Hébert, surrounded by young



THE LOUIS HÉBERT MONUMENT

children to whom she teaches catechism. To the left is seen his son-in-law and heir, Guillaume Couillard, who was the first to use a plough in Canada. The monument when completed is estimated to cost seventeen thousand dollars. This amount is being raised by public subscription throughout Canada.

SECRETARY, DEPARTMENT OF AGRICULTURE

MR. N. Savoie, B.S.A., has been promoted from the office of special officer of the Department of Agriculture to that of Secretary. Mr. Savoie is a graduate

of Quebec Seminary and of Macdonald College. He has been a member of the staff of the School of Agriculture in Ste. Anne de la Pocatière as instructor in drainage.

ONTARIO

ACRE PROFIT COMPETITIONS

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

THE Ontario Department of Agriculture through its District Representatives conducted 53 acre profit competitions during 1916. These are open to young men who have taken the four weeks courses in agriculture conducted by the District Representatives. The prize was the Short Course in Live Stock and Seed Judging at the Ontario Agricultural College, Guelph, January 9th to 20th, transportation to Guelph and return and board and lodging while there. Fifty-seven young men took

the short course at Guelph last month at the expense of the Department as winners in these competitions. Where eight or more contestants finished in a competition two men were sent to Guelph.

In estimating the cost of operation, \$5. per acre was allowed for the rent of the land, \$2. for ploughing, 15c. an hour for manual and 10c. an hour for horse labour. The following is a list of the winners, giving some interesting figures as to cost of production and profits in various crops:—

OATS

(50c. PER BUS.)

COUNTY	WINNER	Yield	Cost of Production	Profit
HALDIMAND	Russell Warner, R. R. 4, Cayuga	60 bus.	\$13 57	\$ 16 43
HASTINGS	Geo. R. Hill, Madoc	58 bus.	13 07	15 93
SIMCOE	Willson Bell, R. R. 3, Coldwater	64 bus., 24 lb.	17 12	14 93
ALGOMA	G. W. Evoy, Bar River	54 bus., 22 lb.	13 35	13 97
YORK	John A. Orr, Maple	59 bus., 13 lb.	15 98	13 72
DUNDAS & WEST STORMONT	J. L. Tait, Northfield Station	55 bus., 13 lb.	14 55	13 51
LENNOX & ADDINGTON	Blake Switzer, Wilton	54 bus., 17 lb.	11 20	13 05
	Clifford Abbott, R. R. 1, Marysville	59 bus.	17 07	12 43
WENTWORTH	Richard A. Quance, R. R. 1, Hannon	57 bus., 13 lb.	16 71	11 98
FRONTENAC	Percival Henderson, Harrowsmith	52 bus.	14 60	11 40
WELLAND	Thomas W. Hicks, Allanburgh	46 bus.	12 22	10 78
VICTORIA	Joseph Staples, Bobcaygeon	43 bus.	12 17	9 33
MIDDLESEX	Allan McLean, R. R. 2, Strathroy	51 bus.	16 64	8 86
PEEL	T. R. Maxwell, R. R. 1, Streetsville	43 bus.	12 75	8 75
GRENVILLE	Geo. E. Wiggins, R. R. 4, Kemptville	36 bus., 30 lb.	11 64	6 81
NORFOLK	Arch. Leedham, R. R. 1, St. Williams	44 bus.	16 15	5 85
GLENCAIRY	Stanley Wightman, Lancaster	40 bus., 8 lb.	15 96	4 16

TURNIPS

(14c PER BUS.)

MUSKOKA & PARRY SOUND.	Henry O'dfield, Powassan	1173 bus., 20 lb.	\$26 36	\$137 90
THUNDER BAY, (PORT ARTHUR).	Joseph Hughes, Murillo	1092 bus.	37 00	115 88
THUNDER BAY, (PORT WILLIAM)	William H. Trewin, Slate River	880 bus.	22 15	101 05
BRANT	Cuthbert Howell, R. R. 1, St. George	885 bus., 40 lb.	31 30	92 69
THUNDER BAY, (PORT ARTHUR).	Alfred Felker, Murillo	840 bus.	36 50	81 10
LANARK	John M. Chapman, R. R. 3, Carleton Place	648 bus.	35 73	54 99
DURHAM	Leonard McNeill, R. R. 1, Frazerville	509 bus.	23 03	48 23
RENFREW	John R. Lindsay, Glasgow Station	408 bus.	21 31	35 81

ACRE PROFIT COMPETITIONS

137

POTATOES (\$1.00 PER BUS.)

COUNTY	WINNER	Yield	Cost of Production	Profit
MIDDLESEX	William S. Courtis, R. R. 2, Mt. Brydges	320 bus.	\$14 67	\$275 33
SUDBURY	Napoleon Chenier, Hamner	295 bus.	38 55	256 45
RENFREW	Arthur Griesse, Beachburg	288 bus.	41 25	246 75
RAINY RIVER	Herbert C. Nixon, Emo	300 bus.	63 08	236 92
ALGOMA	John Wm. Simpson, Sault Ste. Marie	285 bus.	48 10	236 90
TIMISKAMING	Leonard Nickle, Hanbury	208 bus.	63 14	144 86
GRENVILLE	Chas. L. Ferguson, R. R. 3, Spencerville	161 bus.	47 55	113 45
NORTHUMBERLAND	J. Arthur Down, R. R. 1, Hilton	70 bus.	53 87	16 13

MANGELS (14C. PER BUS.)

GREY	James Moffat, Bognor	1112 bus.	\$22 65	\$133 03
MANITOULIN	Harold Letts, Barrie Island	990 bus., 40 lb	20 95	117 74
BRUCE	Gilbert Marshall, R. R. 2, Teeswater	830 bus.	33 55	82 65
HALTON	W. R. Hume, R. R. 6, Milton	560 bus.	16 70	61 70
PETERBOROUGH	Fred M. Crowe, R. R. 1, Lakefield	525 bus., 30 lb.	29 33	44 24
WATERLOO	Daniel Lerch, R. R. 2, Preston	367 bus.	27 47	23 90



A FIELD OF MANGELS IN THE ACRE PROFIT COMPETITION

CORN FOR SILAGE (\$3.25 PER TON)

SIMCOE	Wesley B. Tudhope, R. R. 1, Hawkestone	29 3/5 tons	\$17 97	\$78 23
HALTON	Wilbert Ford, R. R. 4, Milton	22 tons, 880 lb.	12 05	62 51
GREY	Albert E. Buchanan, R. R. 2, Flesherton	24 tons	22 05	55 95
Ontario	Wilbur Baird, R. R. 1, Seagrave	20 08 tons	16 53	48 73
PETERBOROUGH	Allen Taylor, Warsaw	18 3/20 tons	14 60	44 39
LAMBTON	Leslie Griffin, R. R. 1, Sarnia	14 tons, 140 lb.	11 30	34 43
OXFORD	H. E. Hall, R. R. 3, Tillsonburg	13 tons, 1880 lb.	12 99	32 31
BRUCE	Gladstone Tolton, R. R. 3, Walkerton	14 47 tons	18 66	28 36
PEEL	James A. Harper, Bolton	9 3/5 tons	19 73	11 47

SEED CORN (\$1.50 PER BUS.)

KENT	Geo. Verne Robinson, R. R. 3, Dresden	62 89 bus.	\$20 13	\$74 20
LAMBTON	Benner Porter, R. R. 1, Forest	37 3/5 bus.	18 60	37 80

BARLEY
(80C. PER BUS.)

COUNTY	WINNER	Yield	Cost of of Pro- duction	Profit
KENORA	Stanley R. Browning, Oxdrift	50 bus.	\$15 48	\$24 52
	Donald F. McKenzie, Eagle River	39 bus., 17 lb.	13 87	17 63
DUNDAS & WEST STORMONT	Geo. B. Baker, R. R. 1, Newington	23 bus., 19 lb.	11 92	6 80

BEANS
(\$3.50 PER BUS.)

KENT	Robert J. MacDonald, R. R. 3, Ridgetown	12 1/3 bus.	\$14 74	\$28 42
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WHEAT
(\$1.30 PER BUS.)

LANARK	Hugh M. Bowland, Clayton	29 bus.	\$16 08	\$21 92
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PEAS
(\$2.25 PER BUS.)

MUSKOKA & PARRY SOUND.	Ernest Norris	15 bus., 6 lb.	\$19 94	\$14 04
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FEEDING HOGS FOR PROFIT COMPETITIONS

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

EXPERIMENTS at agricultural colleges and similar governmental institutions have done much to demonstrate the possibilities of hog raising. However, there has always existed a difference of opinion in the minds of farmers as to the profitable side of hog raising when the price of grain is high, even though the hogs are commanding an exceptionally good price on the market. With a view to demonstrating the possibilities of hog raising from a financial standpoint, and at the same time encouraging young farmers to give the question of feeding hogs special study and care, the Feeding Hogs for Profit Competition was devised.

The Ontario Department of Agriculture, through its District Representatives, conducted 26 feeding hogs for profit competitions during 1916. These are open to young men who have taken the four weeks courses in agriculture conducted by the District Representatives. The prize was the short course in live stock and seed judging at the Ontario Agricultural College, Guelph,

January 9th to 20th, transportation to Guelph and return and board and lodging while there. Thirty-two young men took the short course at Guelph in January at the expense of the Department as winners in these competitions. Where eight or more contestants finished in a competition two men were sent to Guelph.



HOGS FED BY YOUNG MEN IN PROFIT
COMPETITION

The hogs were selected when six weeks old and a value of \$4. each was placed on them at that age.

Contestants were allowed to feed four and select the best three at the end of the competition. They were fed until 22 weeks of age, and a record kept of the amount of feed used each week. Feed was valued as follows:—

Ground oats	\$25.00 per ton
“ barley	25.00 “
“ peas	35.00 “
“ rye	28.00 “
“ wheat	35.00 “
Bran	23.00 “
Low-grade flour or Red Dog .	32.00 “
Shorts or Middlings	25.00 “
Tankage	46.00 “

Green feed	2.00 per ton
Skim milk	5.00 “
Butter milk	6.00 “
Whey	3.00 “
Pasture . . . . .	.75 per hog

In estimating the profit, the value of the hogs, live weight, fed and watered, was taken at 11½ c. per pound. The prize was awarded by taking into consideration both the profit and the type, 50 per cent being allowed for each, the bacon hog score card being used for scoring type. The following are the winners:—

WINNERS IN FEEDING HOGS FOR PROFIT COMPETITIONS, 1916

COUNTY	WINNER	Breed	Average Cost Production	Average Value	Average Profit
LENNOX & ADDINGTON	Clarence G. Taylor, Odessa	Yorkshire & Tamworth	\$11 11	\$27 48	\$16 37
DURHAM	Herman F. Hooley, Nestleton Station	Berkshire & Tamworth	9 28	25 51	16 23
LANARK	Sedley Steen, R. R. 2, Pakenham	Chester White	12 92	28 44	15 52
VICTORIA	Carl Brokenshire, R. R. 1, Fenelon Falls	Yorkshire & Tamworth	9 83	25 07	15 24
ONTARIO	Frank Johnston, Manchester	Yorkshire	13 28	28 44	15 16
HALDIMAND	Cecil G. Ricker, R. R. 1, Attercliffe	Yorkshire & Chester White	11 13	25 76	14 63
GRENVILLE	Harry M. Lee, Kemptville	Tamworth	9 06	23 46	14 40
LENNOX & ADDINGTON	Charles E. Burt, R. R. 1, Napanee	Yorkshire	11 35	25 62	14 27
GREY	Earl Davis, R. R. 1, Markdale	Yorkshire & Berkshire Cross	10 21	24 38	14 17
PRINCE EDWARD	Harold W. Mmaker, R. R. 4, Picton	Chester White & Berkshire	9 81	23 88	14 07
FRONTENAC	Joe H. Watson, Harrowsmith	Yorkshire	10 32	24 26	13 94
MIDDLESEX	Earl Robinson, R. R. 3, Strathroy	Yorkshire	9 60	23 00	13 40
SUDBURY	Gordon D. Wilson, Massey Station	Berkshire & Chester White	8 77	21 97	13 20
NORTHUMBERLAND	Joseph Hopps, R. R. 5, Campbellford	Yorkshire & Tamworth	10 65	23 54	12 89
FRONTENAC	Wm. Shillington, Bobs Lake	Cross	11 16	23 61	12 45
LEEDS	Alton Shaw, Athens	Yorkshire & Tamworth	9 81	22 25	12 44
RENFREW	Charles Burgess, R. R. 2, Renfrew	Cross	14 69	26 91	12 22
MANITOULIN	Roy L. Pyette, Tehkummah, Manitoulin Island	Yorkshire	10 86	23 04	12 18
DUNDAS & WEST STORMONT	Merton Casselman, Iroquois	Tamworth & Yorkshire Cross	10 44	22 57	12 13
SIMCOE	Thos. F. Swindle, R. R. 3, Orillia	Yorkshire	12 66	24 72	12 06
PEEL	Fred Chapman, R. R. 1, Kleinburg	Yorkshire	9 21	21 12	11 91
KENT	Willard S. Simpson, Ridgetown	Yorkshire	10 82	22 65	11 83
KENORA	William E. Morton, Dryden	Yorkshire	14 61	26 22	11 61
KENORA	Harvey Skene, Dryden	Yorkshire	10 46	21 85	11 39
CARLETON	Clifford Campbell, Fitzroy Harbor	Yorkshire	7 59	18 97	11 38
WATERLOO	Grant Gingerich, R. R. 1, Blair	Yorkshire & Berkshire Cross	19 68	8 56	11 12
GRENVILLE	Robert J. Kelso, R. R. 2, Spencerville	Yorkshire	8 64	19 55	10 91
BRUCE	Gilbert Marshall, R. R. 2, Teeswater.	Yorkshire & Tamworth	8 78	19 51	10 73
YORK	Hector R. Paterson, R. R. 2, Gormley.	Yorkshire	11 21	21 88	10 67
WATERLOO	Howard S. Snider, Box 203, Waterloo	Yorkshire	9 42	19 84	10 42
WENTWORTH	E. H. Cline, R. R. 1, Stoney Creek	Yorkshire & Berkshire	11 53	21 47	9 94
SUDBURY	D'arcy P. McDonald, Warren, Ont	Yorkshire	8 39	18 02	9.63

SASKATCHEWAN

CREAMERIES AMALGAMATION

REPRESENTATIVES from all the co-operative creamery companies of the province met in Regina on December 30th to discuss the question of amalgamation under one head, and to ask the Government for legislation at the next session to consummate the amalgamation.

The purpose of this proposed legislation is to bring into being a larger

and more perfect and strengthened co-operative organization of existing creamery companies with enlargements of powers to enable them to better carry out principles of co-operation and furtherance of the dairy industry of the province, and otherwise relieve the women of the farm from some of the already too heavy burdens of the household duties incident to farm life.

BRITISH COLUMBIA

CO-OPERATION IN DAIRYING

BY T. A. F. WIANCKO, PROVINCIAL DAIRY INSTRUCTOR

OF the 27 creameries now in successful operation within the province of British Columbia only four are at the present time assisted by the Department of Agriculture, and are operating under what is known as the Agricultural Associations Act. Of the balance a number were formed under this same Act and were at first assisted by small loans by the Department, but these have been repaid. The others are purely proprietary, or are Joint Stock Companies formed under the Companies Act. The creameries now receiving financial assistance are:—

Comox Creamery Association, L'td., Comox; Cowichan Creamery Association, L'td., Duncan; Northern Okanagan Creamery Association, L'td., Armstrong; Salmon Arm Creamery Association, L'td., Salmon Arm.

Of these the creameries at Comox, Armstrong and Salmon Arm are concerned only with the manufacture of butter, which is sold either to the

retail trade or through some reliable commission house. The Cowichan creamery has for the past three years carried on very successfully a co-operative business in butter, eggs, flour and mill feeds. An elevating plant has been established, and is working satisfactorily, and includes equipment for cleaning grain, crushing, grinding and mixing. Poultry and eggs are handled co-operatively, and the "Cowichan" brand of butter and eggs have become firmly established on the market and command premium prices.

To eliminate wastage, and to secure a more equitable price to the producer and a correspondingly reasonable reduction in price to the consumer the dairymen of the Fraser Valley and district had, previous to the outbreak of the war, organized The Fraser Valley Milk Producers' Association, with a capital stock of \$250,000. The scheme was partially organized, but nothing more was done owing to war conditions. The

unsatisfactory conditions of the milk and cream business during the past two years have more than ever convinced the producers that some better arrangement must be adopted, and as a result the completion of the organization begun three years ago, is being taken up at the present time with greater enthusiasm than ever, and with every indication that it will become a practical success. The purpose of those who have the organ-

ization in hand is to create an association of dairymen to produce, handle and retail the milk from the entire Fraser Valley. They believe that by dividing the coast cities into districts, and by eliminating the duplication of routes, that each wagon will deliver from 500 to 600 quarts of milk, and by operating a butter and cheese factory the surplus material will be made into butter or cheese.

BOYS' AND GIRLS' CLUBS

BY H. O. ENGLISH, B.A., B.S.A., CHIEF SOIL AND CROP INSTRUCTOR

PRIOR to 1916, the boys' and girls' competitions were conducted in potato growing. This year's boys and girls' clubs were formed and provision was made for the conducting of competitions by these clubs in poultry raising, hog raising, potato growing, and corn growing.

During the early part of the year a bulletin was published, giving rules and regulations governing the organization of such clubs and the conducting of competitions. Although this bulletin was not published until April, and in consequence did not receive very wide circulation a number of boys' and girls' clubs were organized. Of this number, 21 conducted competitions last year. Eight competitions were conducted in poultry raising, ten in the growing of potatoes and three in hog raising; 187 boys and girls took part in these competitions.

The awards will be based on four scores. First, the midsummer score which takes account of the methods

employed by the youthful competitors in the raising of their exhibit; second, the harvested exhibit score; third, the financial report, and fourth, on an essay written by the competitor on "How I produced my exhibit." The midsummer scores were, in many cases, exceptionally high, some competitors scoring almost full marks. The harvested exhibit was in some instances the best of the kind seen in the province last year whether produced by boys and girls or adults, and while the financial statements have not been scored, as yet, we are safe in saying that the boys and girls seem to have a clearer conception of farm accounting than many of the adult farmers of this province. From the interest evinced in this movement last year, without doubt, a large number of new clubs will be organized last winter. Provision will be probably made for the holding of a number of other kinds of competitions, possibly including those recommended by the Domestic Science Department.

FIELD CROP COMPETITIONS

BY H. O. ENGLISH, B.A., B.S.A., CHIEF SOIL AND CROP INSTRUCTOR

FIELD crop competitions were first organized in British Columbia to induce farmers to attempt improved methods of crop production. By offering prize money the Department hoped to encourage the growth of a spirit of friendly rivalry among the farmers in each district. It was also hoped that once a farmer had taken part in any such competition, the experience gained and the marked improvement noticeable in his competition crop would be sufficient to induce him to continue improving his crops.

Provision was made by the Department whereby any Farmers' Institute might conduct one or two, but not more than two such crop competitions, a grant of \$25 being made by the Department toward the prize money for each competition conducted. It was stipulated in the rules governing these that no competition should be recognized as such by the Department unless there were, at least, five *bona fide* competitors. The details regulating the management of the competitions were fixed by the Department and judges were supplied free of charge, while the actual organization and management of the competitions was left in the hands of the Institute conducting same.

Competitions could be conducted in the growing of almost any kind of mixed farming crop including: wheat, oats, barley, grain, hay, fodder corn, peas, alfalfa, clover, potatoes, mangels, field carrots, turnips and kale. The acreages were fixed, and varied in size from one acre in the case of the cereal crops to $\frac{1}{4}$ acre in competitions conducted in root growing.

Fifty-five farmers' institutes conducted eighty-six competitions with a total of six hundred and sixteen

competitors this year. There was a reduction in the number of competitions conducted this year due to the number of enlistments during the year and the consequent scarcity of labour.

Field crop competitions of a similar nature have been conducted by this Department for the past five years. The improvement in field crops throughout the province is readily noticeable. The influence exerted by the field crop competitions should be credited with at least fifty per cent of this improvement. When the competitions were first organized, awards were most often based upon freedom from weeds and disease. During the past year, the scarcity of weeds in competition plots was very noticeable, so much so, that judges have been compelled to make the awards on the basis of seed selection, emphasizing purity of variety and trueness to type of the crop grown.

The crop judges in inspecting the farm crops endeavour in each instance to meet the owner of the crop and by explaining to him the weak points about his competition plot, do a great deal to improve farming practices. Field days are sometimes held by institutes on the day of the judge's visit, and all competitors accompany the judge on his rounds.

It will be readily seen that it is impossible to estimate with any degree of accuracy the benefits derived from such field crop competitions. We think it only fair that we should credit the competitions with doing their part in improving farming methods, increasing crop production and in promoting co-operative practices among the farmers of this province.

PART III

Rural Science

THE TEACHING OF HOUSEHOLD SCIENCE

QUEBEC

BY FR. O. L. MARTIN, INSPECTOR OF DOMESTIC SCIENCE SCHOOLS

DOMESTIC science is taught in nearly all the convents of the province of Quebec. Forty-seven of these institutions, under the management of nuns of various orders, each receive from the provincial Department of Agriculture, from funds provided under THE AGRICULTURAL INSTRUCTION ACT, a yearly grant of \$300, provided that such institutions give a domestic science course, officially recognized, of good efficiency, and that they make a full report on their work three times a year to the said Department.

These domestic science schools are visited each year by a special inspector, who judges their work by the competence of the superintendents and the practical work of the pupils; he examines the latter on the various subjects on the programme, encourages them to work and makes a report to the Department on the condition and progress of each institution.

Three other domestic science schools, also subsidized by the Department of Agriculture, work under the direction of lay teachers and give excellent results.

This makes a total of fifty domestic science schools in the province of Quebec, subsidized by the government.

The reputation of these schools varies according to the length of time they have been established or their vitality.

Only five of the principal schools are here quoted by order of age:

1882, Ursulines Monastery at Roberval, Lake St. John.

1904, Provincial Domestic Science School Montreal, 14 Church St.

1905, Congregation Notre-Dame, St. Pascal, Kamouraska county.

1911, Présentation de Marie Convent, Sutton, Brome county.

1912, Macdonald College, Ste-Anne de Bellevue.

Of these five domestic science schools, three have the title of Normal Domestic Science Schools and may, therefore, grant an official diploma in domestic science to any pupil that has taken the normal course and successfully passed the required examination. Such are the schools of St. Pascal, Montreal and Ste-Anne de Bellevue.

The two others have not, as yet, the same title and have not therefore the same powers; however, although they cannot grant their pupils the official diploma of domestic science, they have been authorized lately by the Council of Public Education to give a summer course for nuns; and this course, very thorough and very practical, has been attended by a large number of nuns. The diplo-

mas or certificates of capacity granted by these two institutions have also been ratified.

The official curriculum of our domestic science schools includes the following subjects; the lectures are followed by practical demonstrations, repeated as many times as necessary:

Cooking and care of utensils, dress-making and sewing, house-keeping, care of clothes and linen, mending, spinning and weaving (at a few schools), knitting, domestic book-keeping, family hygiene and medicines, milking of cows (at a few schools), care of the stable, of utensils and of milk, making butter and small cheese, manufacture of canned goods, study of tissues, food products, furniture and household utensils, horticulture (school gardens), tree growing, bee-keeping, etc.

Class work and practical work are graduated, that is to say, the pupils are only taught the subjects that they can understand and work out in proportion to their age and their knowledge.

The complete course generally lasts eight years for a girl who desires to acquire her whole education at the convent, as well as her training in domestic science. For older girls, who already have some education and some training in domestic science and who, therefore, can at once start with the higher lessons of the course, the term is much shorter particularly for pupils who specialize in the study of domestic science.

The above programme, which may be called the usual curriculum of domestic science, is about the same in all our domestic science schools. However, the school of St. Pascal is the only one which, on account of its title of Normal School, has the right to grant a diploma to the pupils who take the complete course and pass the required examination.

In addition to the usual course, the school of St. Pascal also gives a special course for girls who are qualified to take the same, and at the end of which a diploma is granted to those who have regularly attended.

This course is attended by eight students as an average. The school of St. Pascal, as well as that of Roberval, in the summer, has opened its doors during the last four years to a number of nuns, who come from the various parts of the province to take a summer course, and who undergo a very thorough training in domestic science, which entitles them to a diploma.

It can be stated, therefore, that all our Domestic Science Schools are under a competent direction, as these various schools are managed by women regularly qualified and well trained in the teaching of domestic science.

The Domestic Science School of Church Street also does very good work in the city of Montreal. A tangible proof of this fact may be seen in the number of pupils which were admitted to the course last year, some eight hundred. This course has a special programme, divided as follows:

(a) *Regular normal course*, for the training of teachers in domestic science, September 15th to June 15th.

(b) *Summer normal course*, for teachers, July 8th to July 30th.

(c) *Summer normal course*, for nuns, July 8th to July 30th.

(d) *Public courses*, from the first Monday in October to April 23rd.

From 1907 to 1914, ten pupils, after taking the regular normal course at the above school, have obtained the official diploma, which enables them to teach in various institutions. From 1910 to 1916, one hundred and twenty-one teachers have also followed the normal summer course; during the same period, eighty-three nuns belonging to six different congregations, have taken the special course for nuns. Four of them have successfully passed the examination for the diploma.

Several other nuns, after taking the above course, have obtained their diploma at the school of St. Pascal. The number of diplomas

granted by this school is shown in the following table:

From June, 1906, to June, 1913	21
From June, 1914, to June, 1916: elementary	41
From June, 1914, to June, 1916: intermediate	34
From June, 1914, to June, 1916: superior	19
Total	115

In order to complete the above account and give a fair idea of the work of our forty-eight Catholic Domestic Science Schools, one should add to the list of diplomas that has just been mentioned those that have been granted by the schools of Roberval and Sutton. It should also be stated that the smaller schools, which do not give any title were attended, last year, by nearly five thousand pupils.

In spite of the very heavy task which they have already accomplished within their precincts, the forty-seven religious schools mentioned above have undertaken, during the last few summer vacations, a magnificent work of domestic training in various parts of the province, thereby giving new proof of their patriotic spirit. Only five convents had taken part in this campaign, as an experiment, by suggestion and under the patronage of the Department of Agriculture. The attendance was remarkable, the class rooms were crowded with pupils of all ages and of all conditions. The lessons and practical demonstrations, lasting five consecutive days at each place, were followed with great enthusiasm and the results exceeded all expectations.

The localities where these special courses were given in 1916 are as follows:

Montebello (Grey Nuns of Ottawa).
Ste. Marie de Beauce (Sisters of the Congregation of Notre-Dame).

Trois Pistoles (Sisters of Jesus-Mary).
Fraserville (Sisters of the Good Shepherd).
Drummondville (Sisters of the Presentation).

It is hoped that the same courses will be held in other places this year, if circumstances permit.

Another splendid method of educating the people is the exhibit of the work of domestic science schools, presented at the Quebec fair.

At the last provincial fair, the whole side of the building, 100 by 20 feet, was filled with exhibits of the domestic science schools. All sorts of domestic work were shown. The visitors, attracted by so many fine things made by children, stopped, looked, questioned and learned. Competent persons, paid by the Department of Agriculture, stood ready to give any information to the visitors. In the presence of such practical proofs of patient and skilled work, the public could see what a splendid institution these domestic science schools are. Lessons in cooking and infantile hygiene were also given in connection with the exhibits.

These demonstrations were under the direction of the Church Street School, Montreal. Mademoiselle Jeanne Anctil took direct charge with the help of three teachers of the same school: Mesdemoiselles Boéchat, Paré, and Leblanc.

To conclude, let us say that last winter, at the request of the Department of Agriculture, four teachers accompanied the agricultural lecturers of the Department and of the school of Agriculture of Ste-Anne de la Pocatière, and gave several demonstrations on domestic economy.

Such is, broadly speaking, the work of our domestic science schools.

MACDONALD COLLEGE

BY KATHERINE A. FISHER, HEAD OF SCHOOL OF HOUSEHOLD SCIENCE

THE School of Household Science, which was established in 1907, offers three separate courses to students of Household Science. For those students who can attend classes for only a limited time a three months' course is offered, the only entrance requirement being that the student must have entered upon her eighteenth year, presenting, of course, a satisfactory medical certificate of health. The following subjects constitute the course:—

Cooking, Home Nursing, Household Accounts, Household Administration, Household Furnishings, Laundrying, Millinery, Needlework, Textiles.

In addition to these the student may elect one of the following subjects: Dairyng, Horticulture, Poultry.

It will be noted from the above that this course aims to provide a practical knowledge of the different phases of housekeeping.

This year a short course in dress-making has also been offered for students who wish to give special attention to this subject. It is expedient that such a course be offered during war time, as the training it provides should prove to be of very material benefit to the Canadian girl who wishes to practise thrift and economy. Six periods a week of two hours or over are devoted to dressmaking, and work in laundrying, colour and design, and textiles is also given.

A Homemaker Course of one year is also offered. The work of this course is divided into two terms; one beginning in September, and the other the first of February. This arrangement is made to give students an opportunity of entering the school twice during the year, in

September and in February, as the work of each term is complete in itself. The course includes the following subjects:—

Bacteriology and Hygiene, Chemistry, Cooking, Dairyng (elective), English, Home Nursing, Horticulture (elective), Household Accounts, Household Administration, Household Furnishings, Laundrying, Millinery, Needlework, Nutrition, Physical Training for Women, Physics of the Household, Physiology, Poultry (elective), Practical Housekeeping, Textiles.

Students in this course have the additional privilege of a training in practical housekeeping. A house-keeping apartment, occupied by two members of the staff, is provided for this purpose, and each student is required to spend one week here, carrying out the daily routine of work, buying supplies, keeping the household accounts and administering the housekeeping arrangements in general. The majority of the students registering in the School of Household Science choose the Homemaker Course, as it is planned to give the student a good foundation in the different branches of household work, supplemented by those scientific studies which have a bearing on this work.

The third course offered by the School is a professional one, a course in Institution Administration of two years' duration. This course is designed to train women as administrators in institutions where supervision of housekeeping activities and dietary work is required. Students choosing this course must have entered their twenty-third year, and must possess a sufficient knowledge of English and mathematics to master the clerical and administrative work involved. There is a rapidly growing demand in Canada for women qualified by education, training and native ability to fill such positions in

the various types of our modern institutions. Our hospitals offer a particularly interesting field to these graduates. In fact, several Canadian hospitals now receive graduates of this course, and offer to them Post Graduate work in their Diet Kitchens. This work aims to prepare the student more particularly for directing the dietary work of the hospital. During the first year the student receives a similar training to that of the Homemaker students, and in the second year their time is devoted to the professional side of the work. The Women's Residence of the College offers a splendid practice field for the senior students, each student being required to spend a definite length of time studying and assisting with each phase of the work in the Residence. In addition

to this the Y. W. C. A. of Montreal has very kindly provided a practice field for the students in Cafeteria work, and the High Schools of Montreal have also provided a practice field in School Lunch Room management. The following subjects constitute the work of the senior year:—

Bacteriology and Hygiene, Chemistry, Chemistry of Foods, Cooking, Demonstration Lectures, Household Biology, Institution Planning and Furnishings, Institution Housekeeping, Laundrying (institution), Needlework, Nutrition, Practical Housekeeping.

Upon graduating, each student must complete successfully six months' administrative work in an institution before being granted a diploma by Macdonald College.

MANITOBA

HOUSEHOLD SCIENCE IN THE BRANDON NORMAL SCHOOL

IN the report of the Department of Education of the province of Manitoba, for the year ending June 30th, 1916, B. J. Hales, B.A., LL.B., Principal of the Brandon Normal School, states in his report that the aim in the department of Household Science is:

1. To give a practical Domestic Science training that would enable the students to teach Domestic Science in rural schools if they should have the opportunity.

2. To organize the subject matter so that students may carry on the rural hot lunch work.

3. To study the hot lunch problem so that students may be able to meet the various situations.

4. To work out a suggestive course of study for the teaching of one lesson a week in Domestic Science in the rural school, with special lunch dishes and the use of garden produce.

5. to work out a suggestive equipment list suitable for the carrying out of the course of study.

6. To give some training in organization work by having the students assume the total responsibility attached to the serving of lunches at their various social functions and that of a formal dinner by each class.

The following is a record of topics discussed and of practical work connected therewith:

1. Preliminary lesson:—

Tables of weights and measures.
Relation of measures to weights.
Checking inventory of equipment.
Food principles.
Practical work: Making cocoa.
Discussion re routine work.

2. Cooking fruit, fresh and dried; canning; food value. Practical work: Apple sauce, stewed prunes, canned peaches and pears.

3. Fruit preserving and jelly making. Practical work: Peach and plum jam, crab-apple jelly.

4. Preservation and storage of school garden produce; pickling green cucumbers, tomatoes, onions, red cabbage; mixed pickles; treatment of celery.

5. Small cakes.

6. Beverages: Tea, coffee, cocoa and albuminized drinks.

7. Doughnuts, pumpkin pies from one recipe.

8. Vegetables (supplied from school garden) containing some sugar, non-starchy; beets, carrots, parsnips; vegetable water sauce and white sauce; scalloped dishes.

9. Cream of vegetable soups.
10. Vegetables, starchy. Practical: Potatoes cooked ten different ways. Different varieties tested by cooking, etc., and results noted.
11. Candy making, icings, and fillings.
12. Salads and salad dressings.
13. Fruit cake.
14. Hot lunch. Each group appointed a teacher who organized her group into families and selected cooks to prepare a hot dish in a class room. Others prepared lunches in a variety of ways in the kitchen and then took them to school. The whole experiment was conducted with rural conditions in mind. Results written in reports to file.
15. Poultry.
16. Table setting and serving. Discussion re serving a dinner later on. Summarized results of hot lunch.
17. Flour mixtures, B.P. biscuits.
18. Flour mixtures, B.P. variations.
19. Flour mixtures, muffins, etc.
20. Flour mixtures, cakes.
21. Flour mixtures, bread.
22. Flour mixtures, pastry.
23. Milk: Junket, etc. Milk and eggs, custards, etc.
24. Frozen dishes, wafers.
25. Cheese and cheese dishes.
26. Fish.
27. Meat: Soup stock, tough cuts, charts.
28. Meat: Tender.
29. Meat: Cutting demonstration.
30. Practical examination.
31. Housecleaning and checking up inventory.
31. Discussion re rural Domestic Science course of study, with a view to teaching one lesson a week, each lesson introducing lunch dishes for the following week. Teaching methods applied to Domestic Science. Three groups met daily.
33. Home nursing (3 lessons per week):
 1. Sick room; home nurse; emergency kit.
 2. Emergencies common in school life and how to treat them.
 3. Emergencies, continued.
34. Hot lunches discussion, continued. Proper cupboard discussed; students to design one. Teaching methods continued. Outline plans for first six lessons.
35. Equipment list worked out in relation to course of study and lunch dishes to be served. Discussion and notes on cereals. Review of milling process. Visit to Maple Leaf Mill.
36. Practice in bandaging. Invalid cookery discussed and different diets classified. Gelatine dishes and marmalade.
37. Invalid cookery. Diet. Additional recipes. Hot desserts, etc. Final discussion re rural Domestic Science.

Five Secondary Schools of the province of Manitoba engage an agricultural specialist, and have a special course in agriculture during the winter months for farm boys. The agricultural instruction given in these schools is similar to that given to students of the first and second years at the Agricultural College, Winnipeg. Some of the boys from previous years have entered the Agricultural College to pursue their studies further. Others of Grade VIII and IX standing had taken their places, and the total enrolment in 1916, in special agriculture was about eighty.—*Report of Department of Education for Manitoba, 1916.*

BRITISH COLUMBIA

AGRICULTURE IN HIGH SCHOOLS

THE province of British Columbia is making rapid strides in its agricultural instruction policy. In the December number of THE AGRICULTURAL GAZETTE, on page 1105, it was shown that agricultural courses have been established in five high schools in the province. As pointed out in that article it is proposed to extend this system to other high schools. Early in January a joint conference of the School Boards of Victoria city and of Saanich municipality was held. Both School Boards unanimously approved of the suggestion to have such a course established under a District Supervisor and Instructor to be appointed by the Education Department. Agriculture will be taken as an optional subject with foreign languages and will be taught in conjunction with other high school subjects. Credits will be allowed to students completing their high school course if they should enter upon a regular course in the Agricultural College.

District Supervisors of Agricultural Instruction have been appointed on the following terms and conditions:

1. That the high school in which the course in agriculture is to be given be so situated as to serve the educational needs of pupils in adjacent agricultural districts. A high school offering such a course should either be located in a rural municipality or in a city convenient to such municipality. In the latter case an agreement must be arrived at between the city and municipality whereby high school students resi-

dent in the rural municipality may attend the city high school in question.

An agreement must also be reached by the boards of the city and municipality which thus unite in establishing such an agricultural training centre, whereby each board pays a proportion of the expense.

2. That a class room suitable for agricultural teaching be provided, either in the high school or convenient to it, and that this special class room be equipped with such apparatus and supplies as the Department may direct.

3. That at least one acre of land suitable for experimental work in gardening and agriculture be provided convenient to the agricultural class room, and that the same be suitably fenced and cultivated as directed by the Department.

4. That all expenses in connection with the work other than the salary of the agricultural instructor and supervisor be met by the school boards concerned. These expenses include the travelling expenses of the supervisor in carrying on the work in the public schools of the municipality concerned.

The Department appoints the District Supervisor and Instructor, and pays his salary in full for a period of five years. He must be a graduate of an approved agricultural college and be satisfactory to the Department as a teacher and leader of young people. The salary of these instructors shall be paid from funds provided under THE AGRICULTURAL INSTRUCTION ACT.

At the Victoria High School about one acre of ground will be used for experimental purposes rather than as a school garden, where work will be undertaken by the students in agriculture under the direction of the high school instructor and supervisor.

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

AGRICULTURAL LEGISLATION IN CANADA

THE PROTECTION OF SHEEP

IN the January issue of THE AGRICULTURAL GAZETTE there was printed a list of the Dominion and Provincial Acts relating to Agriculture. From the lists of Acts enforced by the Provincial Governments there has been selected and classified those affording protection to sheep.

The provinces in which there is legislation to this effect are Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta. The following is a brief summary of these Acts, dealing in more detail with that of Ontario, which became law in 1916. The laws affording protection to sheep in these provinces are alike in many particulars. The most important features of the law of Ontario are herewith stated and the main differences in the laws of the other provinces pointed out.

ONTARIO

"The Dog Tax and Sheep Protection Act," which became law in 1916, gives any municipality within the province, power to levy an annual fixed tax upon the owner of each dog, or dogs, within the municipality, excepting the owner of a kennel of pure-bred dogs which are registered in the "Canada Kennel Register," who may in any year pay a tax upon kennel of \$10. The money collected in this way, and paid to the municipality, constitutes a fund for satisfying such damages as arise in any year from dogs killing or injuring sheep within the municipality.

PROTECTION OF SHEEP

The Act provides that:

Any person may kill any dog which he sees worrying or wounding any sheep, or which he finds straying between sunset and sunrise on any farm whereon sheep are kept, unless such dog is kept or harboured by the occupant of any premises adjoining such farm or adjoining any part of any

highway or lane which abuts thereon, or is securely muzzled, or when accompanied by, or within reasonable call or control of, its owner. Further, the owner or occupant of a farm, or his servant, may kill any dog found without lawful permission in an enclosed field on such farm terrifying any sheep.

Persons owning dogs addicted to worrying sheep may be summoned before a Justice of the Peace; in case of conviction the Justice may order the destruction of the dog within three days, and in default thereof may impose a penalty upon such persons not exceeding \$20.

The owner of any sheep killed or injured by any dog shall be entitled to recover damage occasioned thereby from the owner of such dog, by an action for such damages before a Justice of the Peace, such damages being recoverable, whether or not the owner of such dog knew that it was vicious or accustomed to worry sheep. Provision is also made for the apportionment of the damages where the injury was the joint action of some other dog and the dog owned by the person charged, whether the owner of the other dog is, or is not, known.

Any dog, known to have done injury to, chased, or worried, any sheep, shall be destroyed by the owner within forty-eight hours, after having received notice to that effect. Failing to do so, he incurs a penalty of \$2.50 for each dog, and a further penalty of \$1.25 for each dog, for every 48 hours thereafter, until the dog is killed.

The council of every township, town or village may at the first meeting in each year appoint one or more persons, to be known as Sheep Valuers, whose duty it shall be to inspect the injury done to sheep by dogs within 48 hours after having received notice thereof, in cases where the owner of the dog or dogs cannot be found, and the person aggrieved intends to make claim for compensation from the council of the municipality.

The aggrieved party, where owner of dog

is not known, may within three months of killing, or injury to sheep, apply to the council of the municipality for compensation, and if the council is satisfied that he has made diligent search and inquiry to ascertain the owner of the offending dog, they shall award a sum equal to the amount of the damage sustained. After compensation is paid by the council, the claim, formerly made by the aggrieved, shall belong to them.

The owner of any sheep killed or injured while running at large upon any highway or unenclosed land, shall have no right to compensation from a municipal corporation.

All prosecutions under this Act, unless otherwise provided, shall be dealt with in the manner provided by The Ontario Summary Convictions Act.

PRINCE EDWARD ISLAND

An Act respecting dogs became law in Prince Edward Island, April 5th, 1881. Under the terms of this Act, any owner of sheep or lamb killed or injured by any dog is entitled to recover the damages occasioned thereby from the owner or keeper of such dog by an action for damages, or by summary proceedings before a Justice of the Peace.

It is further provided that the owner or keeper of any dog to whom notice is given of any injury done by his dog to any sheep or lamb, shall, within 48 hours cause such dog to be killed; for neglect to do so, a penalty of \$2.50 is imposed and a further sum of fifty cents for each dog for every 48 hours thereafter, until such is killed.

Additional protection is afforded sheep-owners through the Sheep Breeders' Association of the province in the following way: By its incorporation in March, 1914, the Association is empowered to make an agreement with its members as follows: The sheep-raiser pays 1c. per head for all sheep and lambs owned by him on July 1st. If he owns pure-bred sheep that are registered, he may pay an extra 2c. a head. In consideration of this, the sheep are insured to 75 per cent of their value against destruction by dogs. A maximum compensation of \$6 is allowed for each grade sheep and \$15 for each pure-bred sheep; 25 per cent of this insurance is paid from the funds of the association, secured as membership fees, and the remaining 50 per cent is paid by the Department of Agriculture, as a supplementary grant to the Association.

According to the report of The Department of Agriculture for the year ending December 31st, 1915, there were insured with the Sheep Breeders' Association 6,086 grade sheep and 440 pure-bred sheep, and

there were \$25.50 paid in claims for sheep injured by dogs.

NOVA SCOTIA

The Sheep Protection Act of Nova Scotia affords protection to the sheep owner very similar to that afforded by the law of Ontario. It is stipulated, however, that the defendant in any action for damages for killing any dog, as allowed by the act, may, by statute, plead "Not Guilty." The penalty for not killing, after having received due notice, a dog which has killed or worried sheep is one not to exceed \$20. Damages to sheep are recoverable from the owner or keeper of the offending dog by an action for damages before a Stipendiary Magistrate or a Justice of the Peace.

An appeal against any conviction, apportionment or order, made by a Stipendiary Magistrate or Justice of the Peace may be made to the County Court for the county in which the cause of action arose, etc.

NEW BRUNSWICK

Chapter 97 of the Consolidated Statutes of New Brunswick, 1903, "Respecting Protection of Sheep from Dogs," makes provision for the imposition and enforcement of an annual dog tax, which, as in Ontario, constitutes a compensation fund for sheep killed by dogs in a municipality.

The law provides for the killing of dogs, seen killing or injuring sheep, with exceptions similar to those already noted; for the imposing of a penalty, not exceeding \$20 and costs for non-destruction of a dog, known to have destroyed or worried sheep.

QUEBEC

By an amendment of 1912 to the Revised Statutes, 1909, power is given to the council of a rural, village or town municipality to pass a bylaw, if called upon to do so by a petition signed by at least one-fourth of the ratepayers residing in the municipality, which shall provide for the establishment of an annual compensation fund to consist of the proceeds of an annual tax imposed and enforced upon the owner of each dog kept within the municipality. Out of this fund, compensation is paid for damage done to sheep by dogs, when sufficient proof is available that such damage has been sustained. The compensation, however, is limited to five dollars per sheep.

MANITOBA

"The Animals Act," Chapter 7; Revised Statutes of Manitoba, 1913, provides protection for sheep against injury by dogs.

Under this Act it is lawful for any person to kill any dog seen pursuing or worrying sheep elsewhere than on the enclosed land belonging to the owner of such dog.

On complaint made in writing, on oath before any Justice of Peace for the province, that any person owns a dog, which has, within six months previously, worried and injured sheep, the Justice may issue a summons directed to such persons, and if found guilty of the fact, the Justice may order the dog to be killed within three days, and in default thereof, impose a fine not exceeding \$20, with costs; and, in default of immediate payment, may imprison the offender for a period not exceeding thirty days.

In all cases where it has been proved that a dog, concerning which complaint has been made, is mischievous with regard to travellers or to ridden or harnessed oxen, or other cattle, elsewhere than on land occupied by the owner of such dog, the Justice shall order the dog to be killed, under a penalty of \$2 for every day until the dog is killed.

SASKATCHEWAN

The Government of Saskatchewan enforces an Act for the protection of sheep and other animals from dogs. In addition to sheep, this Act protects cattle, horses, sheep, pigs and poultry.

Provision is made for proceedings against the owner, of a dog which has within three months previous, worried, injured or destroyed any cattle, sheep, pigs or poultry outside the enclosed land, occupied by the owner of such dog. Upon conviction, the Justice of the Peace may order the killing of such dog within three days and in default thereof, may impose a fine not exceeding \$20 with costs.

ALBERTA

The law of Alberta, as well as providing protection to sheep as outlined in the foregoing, affords protection against coyotes, which have proved more troublesome than dogs. A bounty of \$10 per head is given on full grown timber wolves and \$1 on pups.

THE DEMAND FOR TRAINED MEN IN AGRICULTURE

At the third conference of Canadian universities which was held at Montreal in May, 1916, President Walter Murray, of Saskatchewan University, presented the report of the committee on graduate work in agriculture. The following extract from the report of the conference gives the findings of the committee:

It is difficult to estimate the number of teaching positions in Agriculture in Canada with exactness. In the colleges there are now approximately 120 men engaged in teaching Agriculture and this number will very shortly reach 200. It is safe to estimate from 10 to 20 new positions to be filled each year for the next ten years. The present number of positions in schools is less than in the colleges, but the prospects are much greater. Within ten years we may expect the school positions to equal the college positions, and to increase much more rapidly thereafter. Consequently, the number of new school positions opening up each year will be large. Let us make a rough guess of from 20 to 30. This will make a total of from 30 to 50 college and school positions opening up each year, and requiring men with qualifications equal at least to the B.S.A.

Administrative posts to the number of at least 300, with a prospective increase in the

near future to nearly twice that number, require the services of men with qualifications approximately the same.

Journalistic and other private enterprises absorb another 100 and will undoubtedly rapidly absorb many more.

These three groups of activities now engage over 500 men, and in the near future will require at least double that number. The annual wastage is surely in excess of one-tenth, probably fully one-fifth. The first figure would require 50 new men each year to maintain present numbers and for expansion. We may fairly add at least half as many more. From 75 to 100 new men are now required each year. This estimate is low, I believe.

The Agricultural Colleges of Canada in 1915 sent forth 100 young men with the B.S.A. degree. In the four preceding years the numbers were 83, 73, 73, 57. A glance at the list of graduates of Macdonald College, for example, reveals the extent of the demand for trained men. There are very few graduates who did not obtain good positions almost before the ink was dry on their diplomas. The new Colleges of Saskatchewan, Alberta and British Columbia will not together turn out more than a score a year for the next six or seven years. The number of men receiving the B.S.A. degree each year from all the Colleges in Canada bids fair to fall considerably short of the demand.

WARM LUNCHES FOR RURAL SCHOOL CHILDREN

IN the State of Illinois considerable progress has been made in providing warm lunches for the children of the rural schools. The children receive in addition to such food as they bring from their homes, at least one warm dish which is changed from day to day. These constitute soups, cocoa, stewed apples, custards, baked beans, etc. The hot dishes are planned and announced one week in advance. Pupils are appointed in turn to take charge of the work. Frequently an older girl, with the assistance of two selected from the younger children are responsible for one week.

Supplies are furnished in different ways. In one country school, the Board donated a certain sum and the remainder was obtained by giving an entertainment. Milk, cream, butter, eggs and fruit are in some

localities furnished each week by the various families. In one district a monthly schedule is arranged and a copy sent to each family having children in school. Each mother then knows on which day she is expected to send a hot dish, or materials for a hot dish to be made. Hot dishes that are brought by the pupils are kept hot by surrounding with hot water until noon.

Equipment varies in different schools. The necessary dishes, cutlery and paper napkins are provided from the homes by the pupils. The cooking is done on the heating stove if adapted to that purpose. In some cases oil stoves with portable ovens are provided. Either ordinary kitchen tables or movable tables on tressels are used according to the space available. Schools with Manual Training Departments readily furnish their own furniture.

BOYS' AND GIRLS' CALF CLUBS

EIGHT banks in the State of Illinois have formed calf clubs. The members of the club are confined to boys and girls of school age. About five hundred members have been enrolled in these clubs. The general purpose of this system of organization is to encourage agricultural prosperity. The children are taught not only how to take a proprietary interest in the raising of cattle, but in doing business as well. Membership is open to all who will buy calves offered for sale by the banks. The calves provided the children are heifers of good milking strain. These are secured in special dairy districts where a supply of good stock is available. They are sold to the members at actual cost prices plus freight and other expenses. The banks accept notes from the children endorsed by their parents or guardians for the calves. The following account of a calf club in Jackson County taken from the *Banker Farmer* gives a general idea of this enterprise:

"Our club was organized June 10, with a total membership of forty-three, of which eight were girls. All are equally enthusiastic, and when in town they always call at the bank to tell us something about their calves. The parents and guardians have the interest of the club just as much at heart as the children; in fact the entire community is keeping close track of the progress being made. Neighbours for miles around have been to see the calves.

Our calves were purchased in Wis-

consin. They were exhibited in a local feed yard and the next day the president of our bank addressed the children, explaining to them the reasons for the organization of the club and the duties and responsibilities devolving upon those to be accepted as members. For each calf there were at least eight applicants, and for one particular animal, 29 children registered. The names of those desiring each calf were written on tickets and there were placed in a hat. To the first whose name was drawn from the hat, the calf was awarded.

The winner, accompanied by parent or guardian, then gave us a note covering the purchase price, and also executed in duplicate, an agreement with the bank. This agreement was made out in complete form and special pains were taken to explain the meaning of it that each child might be taught business methods as well as the care of cattle. . . . We have offered three prizes for the best results in the care of these calves. The prizes will be awarded at the expiration of one year, as follows: \$10 in gold for the first; \$5 for the second, and \$2.50 for the third."

In the case of another club the banker bought three carloads of holstein heifers. Eighty-five heifers were placed in fifty-nine different farms. The boys and girls were to raise their heifers until the last of the year when the banker would hold a sale and give the profit to the young stock raisers.

VARIATION IN WHEAT

A bushel of Fife wheat contains $41\frac{1}{4}$ pounds of flour, $7\frac{1}{2}$ pounds of bran and $9\frac{1}{4}$ pounds of shorts. A bushel of Bluestem wheat contains $41\frac{5}{6}$ pounds of flour, $8\frac{1}{2}$ pounds bran and $8\frac{1}{2}$ pounds shorts. A bushel of Marquis wheat contains $42\frac{3}{8}$ pounds flour, $9\frac{1}{10}$ pounds bran and $8\frac{5}{6}$ pounds shorts. A bushel of Velvet Chaff wheat has $40\frac{1}{4}$ pounds flour, $7\frac{2}{3}$ pounds bran and $10\frac{1}{3}$ pounds shorts. A bushel of Winter wheat contains $41\frac{9}{10}$ pounds flour, $8\frac{1}{4}$ pounds bran and $8\frac{2}{3}$ pounds shorts. And a bushel of Durum wheat mills out $41\frac{1}{2}$ pounds flour, $5\frac{1}{4}$ pounds bran and $11\frac{1}{2}$ pounds shorts.

A bushel of No. 1 Northern wheat will

make 42 pounds of flour, $6\frac{1}{2}$ pounds bran and 10 pounds shorts. A bushel of No. 2 Northern wheat contains $41\frac{1}{2}$ pounds flour, $7\frac{1}{2}$ pounds bran and $9\frac{1}{4}$ pounds shorts. A bushel of No. 3 wheat will make $41\frac{3}{4}$ pounds flour, $7\frac{1}{2}$ pounds bran and $9\frac{1}{6}$ pounds shorts. A bushel of No. 4 wheat will make $39\frac{4}{5}$ pounds flour, $7\frac{9}{10}$ pounds bran and $10\frac{1}{4}$ pounds shorts. And a bushel of Rejected wheat makes $40\frac{1}{8}$ pounds flour, $9\frac{3}{8}$ pounds bran and 9 pounds shorts.

These are averages of 8 years' milling tests conducted at the North Dakota Experiment Station in co-operation with the United States Department of Agriculture.

ASSOCIATIONS AND SOCIETIES

The annual meeting of the Canadian Ayrshire Breeders' Association will be held in Montreal on February 14th, 1917. Secretary-Treasurer, W. F. Stephen, Huntingdon, Que.

The 17th annual convention of the Ontario Association of Fairs and Exhibitions will be held in Toronto on February 6th and 7th. Secretary, J. Lockie Wilson, Department of Agriculture, Toronto.

The annual meeting of the General Stock Breeders' Association of the province of Quebec will be held in Montreal on Tuesday, February 13th, 1917.

The annual meetings of the French-Canadian Horse and Cattle Breeders' Associations and of the Sheep and Swine

Breeders' Associations, will also be held in Montreal, February 12th, 1917. The secretary of these Associations, is J. A. Couture, Quebec.

The annual meeting of the British Columbia Fruit Growers' Association will be held at Victoria, B.C., on February 13th and 14th, 1917. Secretary, R. M. Winslow, Department of Agriculture, Victoria, B.C.

The annual meeting of the British Columbia Poultry Association was held at Nelson, B.C., on December 14th, 1916. The election of officers for the new year resulted as follows:

President, H. D. Reid; vice-president, J. A. Thurston; secretary-treasurer, J. R. Terry, Department of Agriculture, Victoria, B.C.; assistant secretary, Mr. H. E. Upton, Department of Agriculture, Victoria.

RECORDS OF HOLSTEIN COWS

Mr. W. A. Clemons, Secretary of the Holstein-Friesian Association of Canada, at the end of December reported that during the last half of December thirty-two cows and heifers of the Holstein breed made official tests entitling them to entry in the Record of Merit.

As a mature cow Pansy DeKol Artis stands first with a record for seven days of 26.28 pounds of butter. The three-year-old Imperial DeKol made 22.41 pounds of

butter, while Daisy DeKol Mechthilde, a few months younger, made 18.65 pounds. The two-year-old May Echo Lyons twice gave 21.14 pounds in seven days, and 39.54 pounds in fourteen days.

During the month of November and December, eighteen cows and heifers are reported to have qualified in the Record of Performance. In the mature class, Niagara Maid came first with a record for one year of 20,816 pounds of milk and 943.75 pounds

of butter. Among the four-year-olds, the highest was Gamey's Knockaloe May 2nd, who gave 14,159 pounds of milk and 585 pounds of butter. The highest three-year-old was Veeman Beauty Queen, who gave

13,389 pounds of milk and 622.50 pounds of butter. Four of the cows that qualified for Record of Performance Certificates are owned by the Dominion Experimental Farms.

THE MARITIME POULTRY ASSOCIATION

The annual meeting of the above association was held in Amherst, December 15th, 1916. Addresses were delivered by the President, A. F. Houston; Mr. Seth Jones, Poultry Superintendent for New Brunswick, and Geo. Robertson of the Poultry Department, Central Experimental Farm, Ottawa. The election of officers for the ensuing year resulted as follows:

President A. F. Houston, Charlottetown; vice-president, Chas. Johnson, North Syd-

ney; vice-president for Prince Edward Island, W. J. Cudmore, Charlottetown, vice-president for New Brunswick, John P. Bain, St. John.

Directors for New Brunswick: Geo. Seaman, Moncton, N.B.; John Scott, St. John, N.B.; Directors for Nova Scotia: L. J. Walker, Truro, N.S.; C. F. Bowes, Halifax, N.S.; Directors for Prince Edward Island: Albert Boswell, French Fort; W. J. Pickard, Charlottetown.

NEW BRUNSWICK POTATO GROWERS

The annual convention of the New Brunswick Potato Growers' Association was held in the Fisher Vocational School at Woodstock on December 27th, and 28th. A potato show was held in conjunction with the convention. The potato exhibit was exceedingly fine, entries coming from York, Carleton, Northumberland, Kings and Victoria counties. The Dominion Experimental Farms displayed sixty varieties grown at the Experiment Station at Fredericton. Addresses were given on various features of potato culture. The following resolutions were passed:

That the acreage of potatoes entered in each instance in the field crop competition during the coming season be two acres of Irish Cobblers and five acres of Green Mountains.

That competition be limited to members

of the New Brunswick Potato Growers' Association.

That the arrangements for this competition be left in the hands of the Executive Committee.

That the Association become affiliated with the Potato Association of America.

That the Association endeavour to hold a summer meeting in conjunction with the Farmers' and Dairymen's Association, during the coming summer.

OFFICERS ELECTED

President; Mr. T. W. Caldwell, Florenceville, N.B.; vice-president, Mr. Thomas A. Strong, Lindsay, N.B.; secretary, Mr. G. C. Cunningham, Fredericton, N.B.; assistant-secretary, Mr. Geo. Partridge, Fredericton, N.B.; treasurer, Mr. W. H. Moore, Scotch Lake, N.B.; auditor, Mr. W. Jarvis, Woodstock, N.B.

THE NOVA SCOTIA FRUIT GROWERS' CONVENTION

THE 53rd annual convention of the Nova Scotia Fruit Growers' Association was held in the Agricultural Demonstration Building, Lawrencetown, Nova Scotia, on January 16th, 17th and 18th, 1917. A number of addresses were delivered on subjects of great importance to the Fruit Industry, among these were: "Lessons Learned on English Markets", by Mr. J. N. Chute; "Results from Dusting instead of Spraying in the Annapolis Valley", by Mr. Paul A. Murphy, of Charlottetown; "Injurious Insect Pests", by Mr. A. G. Dustan, of Annapolis; "The Green Apple Bug", by Prof. Brittain, of the Agricultural College, Truro; "Off

Crops and their Causes" by W. T. Macoun, Dominion Horticulturist; "Sod Culture for our Orchards", by Rev. G. P. Raymond, Aylesford; "Profitable Small Fruits for the Annapolis Valley" by R. D. L. Bligh, Kentville. In addition to the above, Prof. W. S. Blair, of the Kentville Experimental Station, gave a synopsis of the results from work in Dominion Experimental Orchards. The officers elected for 1917 were: President, Prof. W. S. Blair, Kentville; vice-president, F. S. Johnson, Bridgetown; secretary, M. K. Ells, Port Williams; assistant secretary, F. W. Foster, Kingston; executive committee, S. C. Parker, W. H. Woodworth, J. E. Schaffner and S. Banks.

CANADIAN POULTRYMEN'S BELGIAN RELIEF ASSOCIATION

During the Guelph Winter Fair, held from December 1 to 9, 1916, there was formed a "Canadian Poultrymen's Belgian Relief Association" with the following officers: Hon. President, Prof. F. C. Elford, Dominion Poultry Husbandman, Ottawa, Ont.; president, W. B. Powell, Galt, Ont.; vice-president, H. B. Donovan, Canadian Poultry Review, Toronto, Ont.; directors, John S. Martin, Port Dover, Ont.; George P. Bosanquet, Maple, Ont.; G. B. Curran, Napanee, Ont.; M. M. Fergusson, London, Ont.; secretary-treasurer, Raymond E. Burton, Hamilton, Ont.; chairmen of provincial committees: British Columbia, John R. Terry, Victoria, B.C.; Alberta, A. W. Foley, Edmonton, Alta.; Saskatchewan, R. B. Barker, Saskatoon, Sask.; Manitoba, Prof. M. C.

Herner, Winnipeg, Man.; Ontario, Prof. W. R. Graham, Guelph, Ont.; Quebec (English), Prof. M. A. Jull, Macdonald College, Que.; (French), Rev. Father Liguori, La Trappe, Que.; New Brunswick, Seth Jones, Sussex, N.B.; Nova Scotia, J. P. Landry, Truro, N.S.; Prince Edward Island, Wm. Kerr, Dominion Live Stock Branch, Charlottetown.

It was announced that breeders might be asked for a donation of stock in June next to be sold and the proceeds applied to the needs of the families of Belgian poultry breeders, and that when the war ends a donation of birds, limited to 3,000 head, would probably be sent to Belgium and distributed to breeders under Imperial supervision.

THE NOVA SCOTIA DAIRYMEN'S CONVENTION

The annual convention of the Dairymen of Nova Scotia and the Winter Dairy Exhibition was held at The Agricultural College, Truro, on January 3rd and 4th. Delegates were present from many of the creameries of the province and from some of the cheese factories. The greatest gain of any one year was made in the output of the creameries, they having made 1,586,579 lb. of butter at a value of \$505,734.88.

This being an increase over 1915 of 362,179 lb.

The officers elected for 1916-17 were as follows:

President, D. W. Murray, Scotsburn, vice-president, D. M. Wheaton, Wolfville; secretary-treasurer, W. A. Mackay, Truro. In connection with the convention an exhibition of dairy products was held.

THE DAIRYMEN'S ASSOCIATION OF EASTERN ONTARIO

THE annual convention of the Dairymen's Association of Eastern Ontario was held at Napanee on January 4th and 5th. The average attendance at the session was about 600. There were 181 cheese on exhibition, the quality of which was pronounced to be of very high order. The butter exhibited was not so good, there being only 15 entries of moderate quality.

Special interest was taken in the new Dairy Standard Act. The following resolution was passed:

"That the meeting, while not condemning the principle of paying for milk delivered at cheese factories by butter fat test or pasturizing of whey, yet we think it in the best interests of the dairy business to ask the Ontario Government to postpone the carrying into effect the date of administering the Act, as at the present time it is in advance of public

opinion, or until such times as further educational work is carried on."

Mr. Geo. H. Barr, of the Dairy and Cold Storage Branch, reported the results of experiments to determine the value of pepsin as a substitute for rennet in cheese making. Though equal to rennet, he said that pepsin gave a greater loss of fat in the whey. The cheese industry, he concluded, is in danger of being injured by shortage of rennet.

The officers for 1917 are as follows:--

President, J. N. Stone, Norham; 1st vice-president, R. G. Leggatt, Newboro; 2nd vice-president, Jos. McGrath, Mount Chesney; treasurer, Jas. R. Anderson, Mountain View; secretary, T. A. Thompson, Almonte.

The new board of directors decided to hold the next annual convention in the town of Perth, Lanark county, during the first full week of January, 1918.

THE DAIRYMEN'S ASSOCIATION OF WESTERN ONTARIO

THE fifteenth annual convention and winter dairy exhibition of the Dairymen's Association of Western Ontario was held at Woodstock, Ont., on January 10th and 11th, 1917.

This association has a membership of 268 and is accomplishing good work. In connection with the convention a dairy herd competition was held. This competition makes provision for two classes. Class 1 for patrons of cheese factories. Prizes being awarded to the patrons who furnished the largest amount of milk to any cheese factory in Western Ontario from May 1st to October 31st, 1916, per cow, from a herd of eight cows or over. Class 2 for patrons of creameries. Prizes being given to the patrons who furnished the largest amounts of butter fat per cow to any creamery in Western Ontario from May 1st to October 31st, 1916, from herds of six cows or over.

An exhibition of dairy products was also arranged for, which proved to be a strong factor in improving the quality of Ontario cheese and butter as well as advertising these products in home markets. The officers elected for the year 1917 were as follows: President, R. W. Stratton, Guelph, Ont.; 1st vice-president, Jas. Donaldson, Atwood; 2nd vice-president, Frank Boyes, Dorchester; 3rd vice-president, G. F. Mahon, Woodstock. Directors: Thos. Ballantyne, Stratford; J. N. Paget, Canboro; Robt. Myrick, Spring-

ford; Geo. E. Booth, Ingersoll; W. G. Medd, Winchelsea; Jno. Scott, Woodstock; secretary-treasurer, Frank Hearn, London.

RESOLUTIONS

A large number of resolutions were passed and adopted among these being the following:

RESOLVED: That this association is in sympathy with the plan outlined by the officials of the Dairy Branch of the Ontario Department of Agriculture to stimulate and encourage a grading system for creamery products; also the support of this organization may be counted upon to encourage the methods which may be adopted from time to time by the Agricultural Department to successfully put into operation the new Dairy Standards Act. That this Association appreciated the efforts of the Ontario Government to benefit the dairy interest through the operation of this legislation.

RESOLVED: That this association believes it would be in the best interests for the successful operation of the Dairy Standards Act, if a clause was incorporated in the Act dealing with the payment by test of all milk sold for any purpose, and respectfully suggest that an amendment to the Act be made which will include this provision.

THE SASKATCHEWAN BREEDERS' ASSOCIATION

The executives of the Saskatchewan Live Stock Breeders' Associations for 1917 are as follows:

HORSE BREEDERS' ASSOCIATION

President, Alex. Mutch, Lumsden; vice-president, R. W. Caswell, Saskatoon; directors: R. H. Taber, Condie; A. A. Downey, Arlington Beach; Jas. Dougan, Condie.

CATTLE BREEDERS' ASSOCIATION

President, Hon. W. C. Sutherland, Saskatoon; vice-president, B. H. Thomson, Boharm; directors: John Brandt, Edenwold; W. H. Gibson, Indian Head; O. Olafson, Mortlach.

SHEEP BREEDERS' ASSOCIATION

President, H. Follett, Duval; vice-

president, E. E. Baynton, Bigstick Lake; directors: F. T. Skinner, Indian Head; J. L. Beattie, Piapot; G. A. Logan, Tuxford.

SWINE BREEDERS' ASSOCIATION

President, A. B. Potter, Langbank; vice-president, S. V. Tomecko, Lipton; directors: Philip Leech, Baring; F. T. Skinner, Indian Head; H. Follett, Duval.

POULTRY BREEDERS' ASSOCIATION

President, W. W. Ashley, Saskatoon; vice-president, M. W. Sharon, Regina; directors: Professor Baker, Saskatoon; Dr. Rothwell, Regina; Thos. Reid, Regina.

The secretary of the above associations is P. F. Bredt, Parliament Buildings, Regina.

THE SASKATCHEWAN DAIRYMEN'S CONVENTION

The second annual convention of the Saskatchewan Dairymen's Association was held at the University of Saskatchewan on January 10th and 11th, 1917.

Addresses were delivered by the Honourable W. R. Motherwell, Minister of Agriculture, W. A. Wilson, Dairy Commissioner, C. E. Thomas, Lloydminster, Sask., who pointed out the benefits of cow-testing work; by Dr. M. P. Ravenel of the Missouri University, whose subject was "Milk for City Trade", and by Dr. F. Torrance, Veterinary Director-General.

The officers elected for the ensuing year were:

President, L. C. Wirtz, Wadena; vice-president, A. H. Salmon, Kelso; secretary-

treasurer, K. G. MacKay, Saskatoon. Directors: C. E. Thomas, Lloydminster, Chas. Hankins, Valparaiso; G. W. Black Kerrobert; Mrs. A. E. Ross, Unity; A. P. Hestofor, Cudworth; W. J. Cocks, Birch Hills; Mrs. W. H. Frith, Birmingham.

A number of resolutions of particular interest to the dairy industry were passed. Among these were resolutions expressing approval of the action of the Department of Agriculture in furnishing winter rye to farmers for experimental purposes; expressing approval of cow-testing work and requesting the Dominion and Provincial Governments to give sufficient assistance, as may be necessary, for the general extension of this work.

THE SASKATCHEWAN LIVE STOCK BOARD

THE Saskatchewan Live Stock Board, recently organized, takes the place of the old provincial winter fair board. The constitution of the new organized board states that its objects shall be to promote a spirit of co-operation among the organizations represented on the board, to secure a unity of action in matters of common concerns, to encourage the development and improvement of the Live Stock and Poultry Industry by all means that may be deemed expedient, and to hold winter fairs. The board, as now organized, shall consist of the presidents and vice-presidents of the Saskatchewan Horse Breeders' Association, the Saskatchewan Cattle Breeders' Association, the Saskatchewan Sheep Breeders' Association, the Saskatchewan Swine Breeders' Association, the Saskatchewan Poultry Breeders' Association; the Deputy Minister of Agriculture and the Live Stock Commissioner of the Department of Agriculture; the Dean and the Professor of Animal Husbandry of the Saskatchewan College of Agriculture, and two members to be appointed annually by the aforesaid members.

The officers and members are as follows:

OFFICERS

Honourary-president, Robt. Sinton, Regina; president, W. C. Sutherland, Saskatoon; vice-president, Alex. Mutch, Lumsden; secretary-treasurer, P. F. Bredt, Regina.

MEMBERS OF THE BOARD

Alex. Mutch, Lumsden, representing Saskatchewan; R. W. Caswell, Saskatoon, Horse Breeders' Association;

Hon. W. C. Sutherland, M.L.A., Saskatoon; B. H. Thomson, Boharm, representing Saskatchewan Cattle Breeders' Association; H. Follett, Duval, E. E. Baynton, Bigstick Lake, representing Sheep Breeders' Association; A. B. Potter, Langbank, S. V. Tomecko, Lipton, representing Swine Breeders' Association; W. W. Ashley, Saskatoon, M. W. Sharon, Regina, representing Poultry Breeders' Association; F. H. Auld, Regina, P. F. Bredt, Regina, representing Department of Agriculture; Dean Rutherford, Saskatoon, Prof. A. M. Shaw, Saskatoon, representing College of Agriculture; Robt. Sinton, Regina; E. S. Clinch, M.L.A., Shellbrook, directors at large.

COMMITTEES OF MANAGEMENT FOR WINTER FAIRS

Regina: R. Sinton, Regina; Alex. Mutch, Lumsden; R. H. Taber, Condie; F. H. Auld, Regina; P. F. Bredt, Regina; president, Regina Poultry Association: (Open); D. T. Elderkin, Manager Regina Winter Fair.

Saskatoon: W. C. Sutherland, Saskatoon; Dean Rutherford, Saskatoon; Prof. A. M. Shaw, Saskatoon; S. E. Greenway, Saskatoon; R. W. Caswell, Saskatoon; W. W. Ashley, Saskatoon; C. D. Fisher, Manager Saskatoon Winter Fair.

THE ONTARIO EXPERIMENTAL UNION

THE thirty-eighth annual convention of the Experimental Union of Ontario was held at the Ontario Agricultural College, Guelph, from January 8th to 12th, 1917. The secretary, Dr. C. A. Zavitz, in his report stated that the average number of experimenters per annum between 1886 and 1893 was 315, between 1894 and 1901, 2,608; from 1902 to 1909, 3,882 and from 1910 to 1916, 4,280. Dr. Zavitz pointed out that owing to the scarcity of labour and unfavourable weather conditions the number of experimenters in 1916 was only 3,235. During the year, however, 46 tests were made with O. A. C. No. 72 and O. A. C. No. 3 oats. The former out-yielding the latter by about a bushel and a half of grain per acre. O. A. C. No. 21, barley, out-yielded Emmer in four tests. In nine tests, Wild Goose Wheat yielded a little better than three bushels per acre more than did Marquis Wheat. Other tests were carried on with winter wheat, spring rye, field peas, field beans, soy beans and in mixed grains. A number of tests were made with root and fodder crops.

In potatoes 104 tests were made, the two varieties being distributed to experimenters were the Davies' Warrior and the Extra Early Eureka. The former giving a yield of 101.15 bushels per acre and the latter 89.97 bushels. The Davies' Warrior had 22 per cent small tubers as compared with 18 per cent for the Eureka. Twelve tests were also made with sweet corn, with Golden Bantam again leading Stowell's Evergreen.

Addresses were delivered at the conven-

tion by Professor J. Murray, of Macdonald College, on the subject of the "Cultivation of the Soil;" by Professor H. H. Dean, O. A. C., who dealt with the subject of "Dairy Products in Ontario;" by Professor J. E. Howitt, O. A. C., who presented the report of the "Co-operative Experiments in Weed Eradication;" by F. C. Hart, of the Co-operation and Markets Branch, Department of Agriculture, Toronto, on the "Ontario Potato Industry," dealing particularly with potato growers' co-operative associations; by Professor G. E. Day, O. A. C., on the subject of "Production of Food Stuffs;" by Morley Pettit, Provincial Apiarist, O. A. C., who presented his annual report on the "Co-operative Experiments in Apiculture," by A. H. McLennan on "The Home Garden;" by R. S. Duncan, District Representative, Port Hope on "The Farmer's Apple Orchard," and by H. G. Bell of Chicago, who gave an address on the "Management of Soil Fertility."

The officers elected for the ensuing year were as follows:—

President, H. Sirrett, R. R. No. 4, Brighton, Ont.; vice-president, H. B. Webster, R. R. No. 1, St. Mary's, Ont.; secretary, Dr. C. A. Zavitz, O. A. C., Guelph; assistant secretary, Professor W. J. Squirrel, O. A. C., Guelph; treasurer, A. W. Mason, O. A. C., Guelph; directors, Dr. G. C. Creelman, O. A. C., Guelph; Honourable Nelson Monteith, Stratford, Ont.; P. S. McLaren, Perth, Ont.; A. H. McKenny, Amherstburg, Ont.; Norman James, O. A. C., Guelph, Ont.; auditors, R. R. Graham, S. H. Gandier.

THE OTTAWA WINTER FAIR

THE Ottawa Winter Fair and Poultry Show was held in Ottawa, January 16th to 19th. The entries in the various classes were as follows:—

Horses	193
Beef Cattle, including carcasses	139
Dairy Cattle	100
Sheep, including dressed carcasses and wool	276
Swine, including dressed carcasses	135
Poultry, including eggs and dressed poultry	3,200
Seed	210

THE DAIRY TEST

Of the one hundred dairy cows entered, eighty-nine competed in the seventy-two hour dairy test, which was conducted under the supervision of the Dairy Branch of the

Dominion Department of Agriculture. A departure was made from the programme of former years; the milk from each cow being tested directly after each milking during the test and the result immediately posted on a card behind the animals. This resulted in a greatly increased interest in the test, and served to show the exhibitor the exact performance of his exhibit at each milking. The championship was won by "Flora," a grade Ayrshire owned by Gillespie Brothers, Spencerville, Ont., that gave in the three days 168.3 lb. of milk, 9.45 lb. butter fat and made a total score of 281.14.

The following records were made by the first prize animal in each class:—

AYRSHIRES

Age, Months	Name	Owner	Lb. Milk	Lb. Fat	Total Points
48 or over	Lady Jane	A. S. Turner & Sons, Ryckman's Cor., Ont.	201 1	7 97	252 86
36 and under 48	Irene of Maplehurst	S. A. Cleland, Hemmingford, Ont	152 5	6 71	209 17
Under 32	Villageview Belle	Gillespie Bros., Spencerville, Ont	115 8	5 30	167 40

HOLSTEINS

48 or over	Lady Sybil of Appledale	John Anderson, Oxford Mills, Ont	227 3	8 67	275 18
36 and under 48	Princess Ormsby Dekol	M. McDowell, Oxford Centre, Ont	193	6 65	220 22
Under 36	Pauline Colantha Canary	A. E. Hulet, Norwich, Ont	128 2	5 66	176 72

SHORTHORNS

48 or over	Royal Princess	S. W. Jackson, Woodstock, Ont	143 8	5 65	183 04
36 or under 48	Butterfly Rose	S. W. Jackson, Woodstock, Ont	117 7	4 85	153 5
Under 36	Red Bess	S. W. Jackson, Woodstock, Ont	107	1 54	142 92

JERSEYS AND GUERNSEYS

48 or over	Brampton Judy's Sultana.	B. H. Bull & Son, Brampton, Ont*	134 4	5 68	180 9
36 and under 48	Brampton Brightness.	B. H. Bull & Son, Brampton, Ont	87 4	4 51	138 83
Under 36	Brampton Elsie Forbes	B. H. Bull & Son, Brampton, Ont	78 5	4 14	126 01

GRADES

48 or over	Flora	Gillespie Bros	168 3	9 45	281 14
36 or under 48	Beauty	Thos. P. Charleson, Ottawa	159 1	6 92	217 5
Under 36	Ethel	T. A. Spratt, Billings' Bridge, Ont	138 8	5 05	173 29

THE INTER-COUNTY JUDGING COMPETITION

The Inter-County Live Stock Judging Competition for the Peter White Trophy and a number of cash prizes was again a prominent feature of the Winter Fair. Eleven counties were represented by teams of three boys each, selected and trained by the District Representatives of the Ontario Department of Agriculture. Two classes each of horses, beef cattle, dairy cattle, sheep and swine were judged. The results of the competition were as follows:—

Stand- ing	County	Total Score
1st	Dundas	2,046
2nd	Lanark	1,999
3rd	Peterborough	1,954
4th	Carleton	1,884
5th	Glengarry	1,859
6th	Northumberland	1,825
7th	Leeds	1,786
8th	Prince Edward	1,781
9th	Renfrew	1,745
10th	Grenville	1,672
11th	Lennox & Addington	1,597
	Possible score, 3,000.	

The team representing the county of Dundas will now meet the judging team from York county, winners of the Inter-County Judging Competition, at the Guelph Winter Fair, in a competition at the Union Stock Yards, Toronto, in February, for a special trophy donated by the Union Stock Yards.

EDUCATIONAL EXHIBITS

Among the educational exhibits at the Fair were the Wool and Egg Exhibits of the Federal Live Stock Branch and a special exhibit of Waterfowl—ducks and geese—by the Central Experimental Farm. The different breeds of geese and ducks were shown and described, so that the exhibit offered an exceptional opportunity for becoming familiar with each of the breeds represented.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF
AGRICULTURETHE CENTRAL EXPERIMENTAL
FARM

THE DIVISION OF CHEMISTRY

The report of the Division of Chemistry for the year ending March 31st, 1916, is a report of 185 pages, prepared by Frank T. Shutt, M.A., D.Sc., Dominion Chemist, and deals in detail with the work of his division for a period of 12 months. During the year, as indicated in the introduction to the report, many samples of soils, muds, mucks, marls, manures and fertilizers, forage plants and fodders, as well as samples from the meat inspection division and samples of flour from the British War Office were examined and reported upon. Investigations were also carried on with regard to fertilizers, agricultural meteorology, the value of sea weed, sugar beets, the feeding value of farm roots, fodders and feeding stuffs, and along many other lines. A feature of the report is the chapter describing the work of the division in testing well waters from farm homesteads, and the advice given regarding the location of the well with its general care.

THE SEED BRANCH

Seed Grain: Under this title the Branch of the Seed Commissioner has issued a 4-page pamphlet pointing out the need for prompt action and extreme care in procuring the best available seed grain supplies for the present year, because of injury to the grain crops in the Prairie Provinces and parts of Eastern Canada during 1916. The result of the injury, and its possible effect on the growing crop, are clearly pointed out and illustrated. Seed of strong vitality, of good size and proved by germination tests is recommended only.

THE PUBLICATIONS BRANCH

Agriculture in Canada, pamphlet No. 5 of The Publications Branch, Department of Agriculture, is a reprint from THE AGRICULTURAL GAZETTE OF CANADA of the series of articles prepared by responsible officers in each of the provinces and published from month to month under the general heading, "Agriculture in Canada."

THE PROVINCIAL DEPARTMENTS
OF AGRICULTURE

QUEBEC

The annual report of the Minister of Agriculture, of the Province of Quebec for 1916, has recently been published. This report

is a well-illustrated book of 310 pages, and deals in a detailed manner with the agricultural merit competition, agricultural schools, co-operative agricultural societies, council of agriculture, the dairy industry, domestic science, horticulture, experimental stations, short courses in agriculture and many other features of the work the department conducted during the year.

ONTARIO

The December issue of the Fruit Branch Circular of the Ontario Department of Agriculture, contains a memo prepared by Professor J. W. Crow, O. A. C., Guelph, for the Dominions Royal Commission on the "Fruit Capabilities and Culture in the Province of Ontario," with special emphasis laid upon the subject of tender fruits.

MANITOBA

Sending the College to the Country, by S. T. Newton, B.S.A., Superintendent of Extension Service, Manitoba Agricultural College. Extension Bulletin No. 8 has for its object a clear and authoritative presentation of the various branches of extension work, both along Agricultural and Home Economics lines, that are now operative within the province. The work of the Extension Service is divided into 16 divisions, each of which is briefly, but clearly, described. They are: agricultural societies; home economics societies; district representatives; boys' and girls' clubs; occasional lectures by members of the Agricultural College staff; short course schools; agricultural and industrial surveys, community welfare work; chautauquas and summer camps; farmers' week and conventions; educational exhibits at summer fairs; field demonstrations; exchange libraries; visual instruction; lectures at farmers' organizations; plans for farm buildings; community halls and dwelling houses; publication of bulletins.

Common Breeds of Poultry, by M. C. Herner, B.S.A., Professor of Poultry Husbandry, Manitoba Agricultural College, constitutes Extension Bulletin No. 9, as well as Issue No. 9, in connection with the Manitoba Farmers' Library.

This bulletin is profusely illustrated and deals with the different breeds of poultry, giving a general description of each and the purposes for which they are best adapted. It is chiefly intended as instruction to the members of the Boys' and Girls' Clubs to enable them to learn breed types and to know the adaptability of each breed for specific utility purposes.

SASKATCHEWAN

The Saskatchewan Department of Agriculture for the month of December, 1916, issued three circulars to be posted on the bulletin boards of the banks located in the province. Circular No. 1, outlined the "Marketing Services for Saskatchewan Farmers"; these include co-operative dairying, supplying of live stock on credit terms, and the marketing of live stock, poultry, wool, etc. Circular No. 2, gives a list of the various departmental publications available for free distribution. Circular No. 3, is entitled "Will Rusted Wheat Make Safe Seed?" This circular points out and illustrates the results of tests made at the College of Agriculture, Saskatoon, to ascertain the germination qualities and vigour of growth of rusted wheat. The general conclusion from these tests is: "Sow good Seed - because it is the only kind that carries with it the least risk. Large, plump, round kernels are insurance against backward spring conditions, high winds and drought, and killing frosts after the plants are up."

ALBERTA

The Grading of Creamery Butter, by C. Marker, Dairy Commissioner, The Department of Agriculture in Alberta has during the past few years greatly developed a butter grading system. For this purpose butter grading stations are maintained at Edmonton and Calgary. This grading service is made generally available, and any creamery operator in the province who wishes to take advantage of it may enter into a formal agreement with the Dairy Commissioner acting for the Department of Agriculture. The pamphlet recently published by the Dairy Commissioner contains the terms of the grading

agreement, together with the grading standards and the system of records, with explanatory notes.

BRITISH COLUMBIA

Milk Testing and Dairy Records, by T. A. F. Wiancko, constitutes Bulletin No. 72, which is issued by the Live Stock Branch of the Department of Agriculture. This bulletin deals with the theory and practise of cow-testing, giving general details for making the test and for using the results obtained. The second part of the bulletin is devoted to milk records, pointing out the value of the same and describing and illustrating the necessary equipment, and the methods of keeping satisfactory records.

MISCELLANEOUS

"*Canada's White Pine Possessions Threatened with Extermination*," under this caption an authoritative discussion of white pine blister rust, has been written by H. T. Gussow, Dominion Botanist, Ottawa, and published and distributed by the Canadian Forestry Association, Ottawa. In this pamphlet the origin, symptoms and advanced stages of the disease, as well as the control measures necessary, are thoroughly outlined, described and illustrated.

"*Advertising British Columbia Fruit*" is the title of a booklet recently published by The British Columbia Fruit Growers' Association. The object in view is to show what the association has done to advertise British Columbia fruits throughout the prairie provinces during the past season. It does so by printing on each of its 36 pages a facsimile copy of an advertisement prepared by the Association and published in the press of prairie provinces.

NOTES

A five weeks' short course in poultry-keeping is being conducted at the Manitoba Agricultural College, Winnipeg, beginning January 16th and ending February 20th.

— — —

A series of debates has been arranged between the Junior Farmers' Associations located at Perth and Almonte, Lanark county, Ontario. The subject of the first of these debates, recently held, was "Conscription", while the subject for the next debate is "Resolved that the Government of Ontario should enforce the new pay by test regulation for next season."

A short course in general engineering for dairymen and farmers is being conducted at the Manitoba Agricultural College, beginning on January 16th, 1917, and continuing until March 16th, 1917. Gas and steam engines are receiving special attention.

— — —

A Farmers' Club in West Virginia formed a Community Breeding Association last May with the assistance of their county agent. Nineteen men signed an agreement to breed only to pure-bred Shorthorn sires for three years. Two registered sires, one and three years old, respectively, were secured for the community.

The dairy products marketed in Manitoba during 1916 are shown in the following table:

PRODUCT	Pounds	Price	Total Value
Creamery butter	6,574,510	31.0	\$2,038,098 10
Dairy butter	4,423,289	25 2	1,114,668 82
Cheese	880,728	18 0	158,531.04
Total	11,878,527		3,311,297 96
Milk	45,401,043	2 2	998,822 94
Sweet cream in lb. butter fat	478,242	36 0	172,167.12
			\$4,482,288 02

The New Brunswick Department of Agriculture has announced short courses in agriculture as follows: Agricultural School, Sussex, February 5th to 9th, inclusive; Cheese and Butter Makers' Course, February 12th to 24th, inclusive; Agricultural School, Woodstock, March 12th to 16th, inclusive; Chatham, March 19th to 23rd, inclusive.

Short Courses in Animal and Cereal Husbandry will be held at Macdonald College, Que., from February 13th to 16th, inclusive. This is suitably described as Farmer's Week at Macdonald College. All questions relating to seed, live stock, root crops, soil management, etc., will be studied and form the subjects of special addresses to be delivered by the members of the college staff.

The British Columbia Department of Agriculture has purchased a seed cleaner together with a full equipment of screens for seed, in the hope that farmers in districts where fanning mills are not now available will avail themselves of the use of this machine, as it is the intention of the department to lend the machine to farmers institutes, which are requested to fix upon a date most suitable to the farmers of the district when the seed to be cleaned will be brought to some central point and the machine operated.

Short courses in manual training are held in many agricultural towns and in consolidated rural schools in Minnesota. The work is begun in the woodwork shop with a few simple useful joints. After acquiring an acquaintance with the tools and their use, each boy, with the assistance of the teacher determines on some larger project which is within the limits of the boy's ability. They are afterwards given instruction and practice in forging. In some of the schools, instruction is given in home repair work, sheet metal work and concrete construction.

The British Columbia Department of Agriculture has announced a distribution of free samples of seed of the leading varieties of the common mixed farming crops to members of farmers' institutes, throughout the province. This distribution includes Marquis, Red Fife and Blue-stem Seed Wheat; Banner, Seger, Garton No. 22, Leader, and O. A. C. No. 72 Oats; Burbank, Carmen No. 1, Gold Coin, Netted Gem and Eureka potatoes. In addition to the foregoing, samples of barley, flax seed and sugar beet seed will also be distributed.

The Women's Institute Division of the New Brunswick Department of Agriculture is offering four 10-day's courses on home economics at the Agricultural School, Woodstock, February 6th to 16th; February 20th to March 2nd, and at the Agricultural School, Sussex, from March 13th to 23rd and from March 27th to April 6th.

Each course will include classes in millinery, theoretical and practical cookery, sewing, home-making, first aid, house-planning and furnishing, as well as a special class for mothers.

Agricultural instruction cars have been equipped by the provincial Department of Agriculture, including the Ontario Agricultural College, in co-operation with the Grand Trunk Railway company, to be run over the Grand Trunk lines of Western Ontario from January 8th to March 14th, inclusive. Special exhibits, dealing with farm crops, soils, lightning protection, weeds, insects and fungous diseases, vegetable growing, feeds, fertilizers, dairying, poultry, egg production, household labour-saving devices, have been prepared by the College staff and specialists connected with the various branches of the Department of Agriculture. In connection with the itinerary, which includes one-day stops at many points, evening meetings will be held when lectures will be delivered, and moving pictures of agricultural interest exhibited.

INDEX TO PERIODICAL LITERATURE

The Agricultural Journal, Victoria, B.C., January, 1917.

The Boys and Girls of British Columbia Could Easily Raise \$50,000. This Year's Boys' and Girls' Competitions Have Shown that the Young People are Successful Agriculturists, S. H. Hopkins, Assistant Live Stock Commissioner, page 195.

The Canadian Threshermen and Farmer, Winnipeg, Man., January 17th, 1917.

The Weed Problem in Manitoba, Substance of an address by S. A. Bedford, Chairman of Weeds Commission, delivered at the meeting of the Union of Municipalities at Brandon, page 5.

The Farm and Ranch Review, Calgary, Alta. January 5th, 1917.

About Observations on Common Plant Diseases Which Affected Saskatchewan Farm Crops During 1916, Professor G. H. Cutler of the University of Saskatchewan, Saskatoon, page 11.

January 20th, 1917, Saskatchewan's Live Stock Distribution, P. F. Bredt, Live Stock Commissioner for Saskatchewan, page 38.

Seed Wheat from the Rusted Crop, G. H. Cutler, Department of Agriculture, University of Saskatchewan, Saskatoon, page 40.

Farm and Dairy and Rural Home, Toronto, Ont., January 11th, 1917.

Wanted: More Good Cows on Canadian Farms, Chas. F. Whitley, in Charge of Dairy Records, Ottawa, page 3.

January 18th—The Four Great Branches of the Dairy Industry in Ontario. Some Suggestions as to How Great Economies Could be Effectuated, Prof. H. H. Dean, O. A. C., Guelph, page 51.

The Gasoline Tractor as a Source of Power on the Farm, Prof. Jas. Murray, Macdonald College, Que., page 53.

January 25th.—Increasing Dairy Products by Lowering Production Costs, Prof. A. Leitch, Farm Manager, O. A. College, Guelph, Ont., page 75.

Farmers' Advocate and Home Journal, Winnipeg, January 17th, 1917.

Saskatchewan Agricultural Societies' Convention, W. J. Thompson, Saskatoon, page 79.

January 24th, 1917, Manitoba Live Stock Convention, The Live Stock Editor, page 115.

Farmers' Magazine, Toronto, January, 1917.

News from Women's Organizations, page 38.

Fancy Cream Cheeses, Belle Millar, Dairy Instructor, O. A. College, page 24.

The Grain Growers' Guide, Winnipeg, Man. January 3rd, 1917.

Durum Wheat. A Review of its Desirable and Undesirable Characteristics, Prof. J. Bracken, University of Saskatchewan, page 9.

The Saturday Press and Prairie Farm, Saskatoon, Sask., January 6th, 1917.

Making a Start with Sheep, Prof. W. H. J. Tisdale, University of Saskatchewan, page 3.

The Farmer's Advocate, London, Ont., January 25th, 1917.

Education and the War, Sinclair Laird, Dean of the School for Teachers, Macdonald College, page 127.

January 18th—The Dairy Situation in Canada, page 87.

Grain Growers' Guide, Winnipeg, Man., January 24th, 1917.

California Fruit Growers' Exchange. How 8,000 fruit farmers got together and turned loss into profit by mutual help and business methods, Don Francisco, page 127.

Saving Dollars Selling Stock, How a Co-Operative association makes live stock shipping a leading feature of its work. These should be jointly organized where possible, J. W. Payne, page 128.

The Western Home Monthly, Winnipeg, Man., January, 1917.

Woman and the Home. The Divine Heritage of Childhood, Louis Schneider, page 37.

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March 1917

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

Issued by direction of
THE HONOURABLE MARTIN BURRELL
Minister of Agriculture

OTTAWA
GOVERNMENT PRINTING BUREAU

1917

CONTENTS

	PAGE
To the People of Canada.	169

PART

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farm:--	
The Division of Horticulture:	
Vegetable Varieties of Canadian Origin, by A. J. Logsdail	171
The Entomological Branch:--	
The Cyclamen Mite, by Wm. A. Ross.	174
Further Observations Upon the Habits of the Western Wheat Stem Sawfly in Manitoba and Saskatchewan, by Norman Criddle.	176
The Fruit Branch:--	
The Sale of Canadian Apples in Bristol, by D. Johnson.	178
The Seed Branch	
Paper Packet Seed Investigation, 1916, by E. D. Eddy	179
Honour Roll of the Dominion Department of Agriculture	185

PART II

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

Land Drainage:	
Prince Edward Island, by W. R. Reek	186
Nova Scotia, by M. Cumming.	187
New Brunswick, by J. B. Daggett.	187
Quebec, by F. N. Savoie	189
Ontario, by J. R. Spry.	190
British Columbia, by H. O. English	192
Spraying Experiments:	
Nova Scotia, by W. H. Brittain	193
Quebec, by J. H. Lavoie.	196
School of Agriculture of Ste. Anne de la Pocatière, by Rev. Father J. P. Levasseur.	199
Shall We Continue to Spray, by Rev. Father Leopold.	199
Ontario, by W. F. Kydd.	207
British Columbia, by R. M. Winslow	209
Controlling Apple Scab in British Columbia, by R. M. Winslow	210
Nova Scotia:--	
District Representative Work, by M. Cumming	215
Quebec:--	
Macdonald College:	
Suburban Gardening Short Course.	216
Ontario:--	
Increased Production of Vegetables.	216
Vineland Horticultural Experiment Station:	
New Varieties of Vegetables.	216

Saskatchewan:—	
The Feeding of Dairy Cattle, by A. M. Shaw	218
British Columbia:—	
The New Minister of Agriculture	219

PART III

RURAL SCIENCE

Home and School Gardening:—	
Prince Edward Island, by J. E. McLarty	220
Nova Scotia, by L. A. DeWolfe	221
New Brunswick, by R. P. Steeves	222
Quebec, by Jean-Charles Magnan	223
Ontario, by J. B. Dandeno	224
Manitoba	226
Southern Saskatchewan, by A. W. Cocks	226
Northern Saskatchewan, by Fred W. Bates	227
Alberta, by Jas. C. Miller	228
British Columbia, by J. W. Gibson	229
Ontario:—	
Increased Food Production	231

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Progress of Pure Seed Production in Canada, by L. H. Newman	232
Vegetable Growing by Girl Guides	233
Associations and Societies	235
New Publications	242
Notes	244
Index to Periodical Literature	246

The Agricultural Gazette

OF CANADA

VOL. IV

MARCH, 1917

No. 3

THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at \$1.00 per annum, or 10 cents per copy.

Subscriptions should be forwarded to the Editor, Agricultural Gazette, Ottawa.

TO THE PEOPLE OF CANADA

TWO years ago in a message to the farmers of Canada special emphasis was laid on the important part food production and distribution would play in this world war. It was pointed out that the drafting of twenty millions of men into European battlefields and the destructive process of war itself must inevitably be followed by diminished production and enhanced cost of food. To-day Roumania, Poland, Belgium are conspicuous and tragic examples of what these things mean. The German food ration is now half the normal requirement and under the steady pressure of British sea power the Hun is daily tightening his belt. But though the great stress is on the Central Powers other nations are feeling the strain. The smaller neutral countries are confronted with food shortage and high prices. Switzerland and Holland, in arms for defence, feed from their own scanty supply thousands of refugees who, homeless and destitute, have fled thither for sanctuary. England, menaced by an ever-increasing submarine warfare, is organizing her agriculture on a new basis, enlisting for her farms the services of women and disabled soldiers, and putting her beautiful and historic parks under the plough. France sows her grain and reaps her harvest, even within the sound of the guns, by the heroic and unceasing labour of her old men, women and children.

Such is the picture of Europe at this hour. Facing the fateful days which lie before us in this third and sternest year of the war we realize with increasing clearness how vital a factor in the final decision the food supply must be. The Government of this country fully appreciates what the farmers have done during the past two years. In urging them to maintain their efforts, though confronted with more difficult conditions, I do it, not because of the high prices which will doubtless hold for nearly all food products, but because of the important and special service which Canadian agriculture can render the Empire at this juncture. All who assist in this work render a great service to the State. I do not say the greatest for that is done by those who, facing death, daily serve their country at the battle front. Thousands of us cannot so serve, but we, who are mercifully free from the iron heel of the invader—we, who know nothing of the terrors by

sea and the privations on land which others suffer, may well redouble our efforts to supply what they may sorely need.

I especially appeal in this critical year to those in our cities and towns who hitherto have not felt the necessity for directing their energies to food production. Individual efforts, even though small and unskilled, will in the aggregate mean much. By applying their labour to uncultivated land near their homes, or by assisting farmers, everybody having health can accomplish something. There is need, not only for an increased supply but for a wise economy of food. If all labour is not efficient there can at least be patience and forbearance where partial efficiency is accompanied by willingness. There is no place in the State now for either half-hearted service or ill-founded criticism. In the common task which faces the country CO-OPERATION should be the watchword. The Dominion and Provincial Departments of Agriculture are already giving, and will continue to give, special attention to the many problems involved. The National Service Board and the municipalities are also devoting their energies to these questions, and I am confident that the various organizations both of men and women throughout the country will give whole-hearted and active support to a work which at this special time is a high and necessary national service.

MARTIN BURRELL,

Minister of Agriculture.

Conjointly with the foregoing the Honourable the Minister of Agriculture has issued a note addressed to mayors and heads of municipal organizations urging them to do their utmost to encourage active and energetic response to the appeal. This note emphasizes the matters set forth in the appeal. Particularly does it call upon citizens to do all within their power to aid the farmer in his efforts at production. It points out that in doing this service is being rendered to the country and to the empire. Every pound of food produced, whether on the farm, in a vacant lot or in the back-yard, adds to the exportable surplus and helps to relieve the pressure on the purses of the people. Pamphlets dealing with home and vacant-lot cultivation are to be issued and to be followed by practical and timely instruction in the form of leaflets, circulars and bulletins. Instances are given of remarkable results obtained last year by vacant-lot gardening. Municipal councils, it is suggested in the note, might help by inducing citizens during vacation-time, and in the spring and autumn, to render such assistance to farmers as they are capable of. The mobilization of all available help is a necessity and the Minister feels confident that the churches, schools, boy scouts, horticultural societies and women's organizations will all gladly assist in every way possible in the patriotic work of cultivation and production if but shown the way. The returns to the National Service Board abundantly prove this. After pointing out that the services of all the officers of the Federal Department of Agriculture are at the disposal of those wishing to help and seeking information, the note closes by stating that a special officer has been appointed to deal with the subject of back-yard and vacant-lot gardening and that a bureau has been formed to deal with all matters relating to food production, to which inquiries can be addressed postage free, in this way:

BUREAU OF INFORMATION,
Central Experimental Farm,
Ottawa, Ont.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

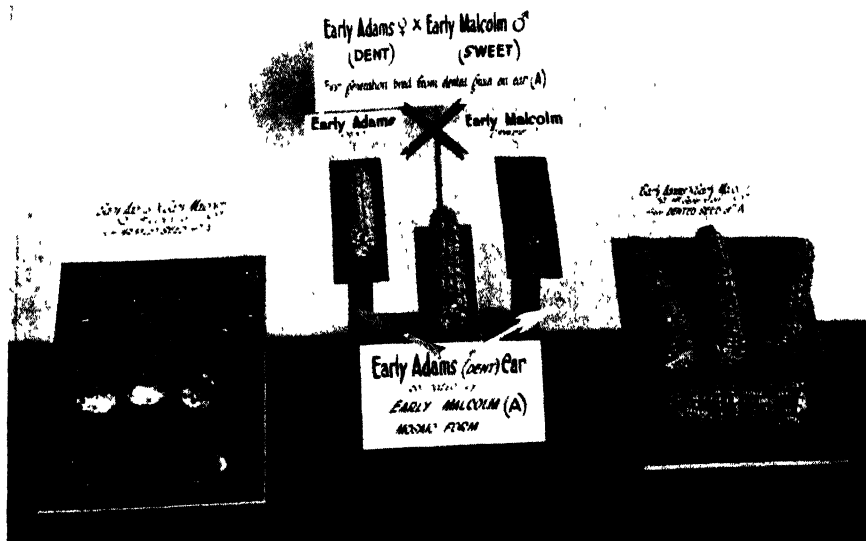
VEGETABLE VARIETIES OF CANADIAN ORIGIN

BY A. J. LOGSDAIL, B.S.A., ASSISTANT IN PLANT BREEDING

NO authoritative journal or publication has recorded the successes achieved from time to time by Canadian growers in the production of new and valuable varieties of vegetables. There can be no doubt that such a record should exist, and it is with the object of

securing data for such a record that this article has been written.

It might be well at the outset to define the meaning of the term, "A variety of Canadian origin." In correspondence dealing with this subject the important difference in the meaning of the terms "origin"



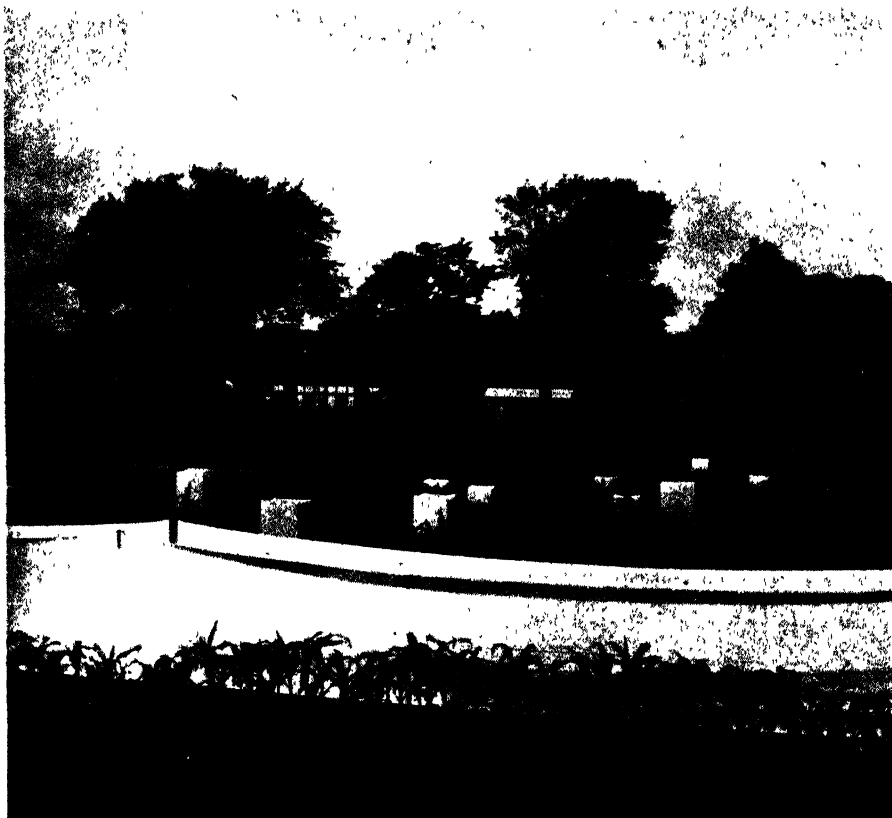
ILLUSTRATING THE PARENTAGE AND EXTRACTION FROM THE HYBRID EAR OF THE
NEW SWEET CORN ON THE LEFT OF THE PHOTO THAT IS NOW BEING TRIED
OUT UNDER THE NAME OF "EARLY OTTA"

and "introduction" does not seem to have been fully appreciated; moreover, the difference between methods and materials of "Selection" has led to a misconception of what may justly be termed a new variety by this means of plant improvement.

A variety selected for a number of years with the object of intensifying its typical characteristics in a more

ducing a new and original form, clearly distinguishable from its parentage, may be considered a new variety; and where such work has been done in Canada, such a variety of merit would comply with the definition, "A variety of Canadian origin."

Secondly. The term "variety"



CORN BREEDING

Corn Selections Protected by Screens and Cotton Cages at the Central Experimental Farm, Ottawa

marked degree cannot be described as a new variety, but may with merit be described as "Improved" or "Selected;" therefore, the following definitions and limitations of variety origin have been made.

Firstly. A type or variety resulting from the crossing of two distinct types or varieties and thereby pro-

has been taken in its broadest sense, to include instances where a variety has been subject to definite selection and rigid elimination for a number of years, and the resulting type has acquired a character noticeably different from that of the parent type, and has the ability of maintaining this type under a variety of conditions.

SWEET CORN

"Early Malcolm."—Selection and crossing from a number of types of the Malakoff sweet corn originally introduced from Russia. Produced by the Central Experimental Farm, Ottawa.

GARDEN PEA

"American Wonder."—A cross resulting from Champion of England and McLean Little Gem. Produced

sport or raised from seed is not known, but was produced by Mr. T. Rowan of MacGregor, Manitoba, and introduced to the trade by A. E. McKenzie & Company of Brandon, Manitoba.

TOMATO

"Byron Pink."—Reported to be a cross between Earliana and Dwarf Champion. Produced by Mr. N. Sanderson of London, Ontario.

"McInnis Plentiful."—Origin un-



STRAINS OF ALACRITY TOMATO UNDER TEST AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA

by Charles Arnold of Paris, Ontario, in 1878, and sold to the seed firm of Bliss & Company for \$1,000 and introduced by this firm to the trade.

POTATO

"Dempsey's Seedling."—Reported to be a cross of Early Rose by Early Goodrich. Fairly extensively grown in parts of Ontario and reported favourably upon by a committee of growers in 1882. Produced by Mr. P. C. Dempsey of Albury, Ontario.

"Wee Macgregor."—Whether a bud

known. Has been fairly extensively grown in parts of western Ontario. Produced by Mr. A. McInnis of London, Ontario.

"Alacrity."—Produced by crossing types of Earliana and Wealthy that had formerly been selected for a number of years, the hybrid being then selected for an early fruit of good quality. Produced by the Central Experimental Farm.

It is not claimed that the list of vegetable varieties of Canadian origin recorded in this article is by

any means a complete one, but it may be said to include the best known and most worthy productions of Canadian growers. Without doubt, varieties of local merit have been produced in many parts of Canada, and some of these might well be worthy of greater distribution were their merits more generally known. It is hoped, however, that by means of a "Record of Achievement" such as this, the meritorious work of our horticulturists may receive due recognition, and their productions the publicity that they may deserve. It is to be hoped that a similar record may soon be compiled for fruits and flowers, along which lines Canadian growers seem to have met with greater success.

In a work of such great importance

a work that directly benefits thousands of growers and indirectly the welfare of the whole country, one cannot help regretting that information along this line is so meagre and difficult to find. It would be well then to recognize the enthusiasm of such pioneers in the work as W. H. Mills, Hamilton, Ont., P. C. Dempsey, Albury, Ont., F. E. Buck, Experimental Farm, Ottawa, Chas. Arnold, Paris, Ont., Francis Peabody Sharp, Woodstock, N.B., and the late Dr. Wm. Saunders of London, Ont., and later, Director of Experimental Farms, Ottawa, Ont. These and many others are deserving of recognition, not only by horticulturists and agriculturists, but by the country as a whole.

THE ENTOMOLOGICAL BRANCH

THE CYCLAMEN MITE

BY WM. A. ROSS, FIELD OFFICER, DOMINION ENTOMOLOGICAL LABORATORY, VINELAND, ONT.

SEVERAL complaints were received from florists in Hamilton, Brantford and Niagara Falls during last fall (1916) concerning a cyclamen disease which, by destroying the flowers and flower buds and by curling the foliage, made the affected plants absolutely worthless. One florist informed us that on account of this trouble he had been compelled to throw out almost nine hundred out of one thousand cyclamens. On examining some of the diseased plants, it was found that the injury was produced by a minute mite working of the flowers and foliage. Specimens of the pest were submitted to Mr. G. F. Moznette, of the Oregon Agricultural College, who reported that it was an undescribed species of *Tarsonemus*. He further stated: "This mite is the same one which is working on various greenhouse plants on the Pacific Coast. This mite has proved very

serious here and many of our florists have lost their entire crops on account of it."

The mites, in all stages, including the eggs, occur on the bloom and tender foliage. They may be found on almost any portion of the flower—on the petals, stamens and ovary, but, as a rule, most of them make themselves at home between the calyx and corolla. Attacked flowers become distorted, streaked and flaccid in appearance and die prematurely. In many cases, the flower buds do not open but gradually wilt and die. Infested foliage becomes curled, at the point of attack little depressions or pockets may be formed, and the leaf epidermis may assume a dark, purplish and cracked appearance.

The adult mites are pale brown, ovate creatures about .2 mm. long. The immature forms are translucent. The eggs are oval, translucent bodies about .12 mm. x .06 mm. All stages

are barely visible to the naked eye.

Control: According to Mr. Mozzette, this pest has been satisfactorily controlled in Oregon by spraying with a nicotine solution (Nico-

flats to pots. From then on to the time the buds are formed, subsequent applications should be made at intervals of ten days. It is highly probable that the addition of soap



CYCLAMEN INFESTED WITH MITES (*TARSONEMUS*)

Note Streaked Appearance of the Flowers

Fume, or any other standard nicotine preparation). The spray should be applied first when the young cyclamens are transferred from the

to the nicotine solution would make it more effective (three of four ounces of soap to five gallons of spray).

FURTHER OBSERVATIONS UPON THE HABITS OF THE WESTERN WHEAT STEM SAWFLY IN MANITOBA AND SASKATCHEWAN

BY NORMAN CRIDDLE, ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

ADDITIONAL data relating to the habits of the Western Wheat-stem Sawfly (*Cephus occidentalis*) has been obtained since the publication of Entomological Bulletin No. 11 which it seems wise to make available on account of the rather rapid spread of the insect during the last two years.

As has already been pointed out, the insect in its native state bred within the stems of certain wild grasses, particularly in those of the genus *Agropyron*. In sandy soils the species of grass most infested was *Agropyron richardsoni*, but as one proceeds westward or moves from sandy to richer soil the above species becomes less prevalent and its place is taken by *A. smithii*, a grass more closely related to our couch grass (*A. repens*) with very similar habits of spreading by means of underground root stocks. *A. smithii* is a very common grass on the western prairies and one of considerable economic importance as a fodder plant. In times of drouth its stems seldom attain the size sufficient to accommodate the sawfly larvæ, but under ordinary weather conditions at least a third of such stems are available and at times of abnormal rainfall probably 90 per cent would be suitable for the insect to breed in. Thus we see that the Western Wheat-Stem Sawfly has been dependent, to a large extent, upon precipitation even though there are always sufficient suitable grass stems to enable it to perpetuate itself from year to year. This is extremely important because, while the sowing of cereals, particularly wheat and rye, has placed an almost unlimited supply of food at the insect's disposal, there are, nevertheless, times when the sawfly appears to disappear gradually from cultivated crops, as

if such crops were not wholly suitable to its requirements. At such times it is dependent solely upon its native food plants, an absence of which might well provide for its extinction. Such an event however, is not probable, though we can see how the destruction of grass stems during the middle of July might well provide an immunity from attack for a number of years.

It will be seen from the above that the insect's perpetuation is apparently dependent upon certain wild grasses, even though it nominally infests cereals to a large extent. There is, however, one noteworthy exception. *Agropyron smithii*, as we have mentioned above, has a close allied species in *A. repens*; in fact some botanists have classed them as near varieties, *repens*, however, is a stouter species. It has larger stems as well as greener leaves; it is also a weed of the first rank. Its importance from an entomological point of view, however, lies in the fact that its larger stems prove remarkably well adapted to the requirements of the Western Wheat-stem Sawfly. Instead of providing 50 per cent of suitable stems under normal weather conditions as does *A. smithii*, *A. repens* produces almost a hundred per cent. Thus we can add to its objectionable nature as a weed by showing that it acts as a distributing agent for the Western Wheat-stem Sawfly.

Other grasses which have proved of greater importance as hosts to the sawfly than was thought to be the case at first, are the various species of Lyme grass—*Elymus* spp., most of which show a marked preference for deserted fields, roadsides, etc. They are all bunch grasses and being perennials remain in the same situation year after year. The im-

portance of this lies in the fact that the sawfly adults are not obliged to fly long distances in search of suitable grass-stems for oviposition. The surplus must, indeed, seek new plants but the species is nearly always assured of perpetuation in the vicinity.

As I have already pointed out, the continuous breeding of the Western Wheat-stem Sawfly in growing cereals is problematical. We have good reasons to suspect, however, that the grain stems are not altogether suitable for this purpose. One reason for this belief lies in the fact that mature larvæ in wheat stems are seldom as large as those found in wild grasses, as a matter of observation the wheat stems are too large beside being weaker than the grasses. Another reason leading to this belief is the actual disappearance of the insect from heavily infested fields after a few years, a departure certainly not due to parasites.

The points I have tried to bring out are that the Western Wheat-stem Sawfly still depends largely upon wild grasses for its perpetuation. That couch grass, *A repens*, is not only noxious as a weed but also as a breeding medium for the sawfly, and as it grows freely among the various cultivated crops it is probably a greater menace as a breeder of sawflies than any other species of the grass family.

ADDITIONAL METHODS OF CONTROL

Apart from deep ploughing between August 1st and June 1st of the following year, and the other methods recommended in Bulletin No. 11, it has been found that trap crops may also be used to considerable advantage. The method employed is to sow a narrow strip, one width of a seeder, between the previous season's infestation and the new crop, but as near to the former as possible. The trap crop should consist of either rye or wheat and should be sown as soon as possible in the spring so that it is well advanced before the sawflies emerge from the old stubble in June. The sawflies, habits of ovipositing upon the first available stems that they find will induce most of them to remain and breed upon the trap crop and thus provide immunity for the fields beyond. The trap crops can either be ploughed down about the middle of July or cut with a mower at that time, both methods being sufficient to destroy the larvæ residing within the stems. Couch grass when growing upon semi-packed soil usually has its entire stem above ground, a condition seldom met with in other members of the genus. It is thus possible to destroy the infested stubs by burning and consequently the larvae within them are killed. In most instances, however, burning is not a practical means of killing the sawfly larvæ.

"When it comes to production, every available square yard of land must be made to produce food, and the labour available for tillage should not be turned to mere ornamental purpose until the food necessities of the country have been adequately safe-guarded. The best use must be made of the land and of all available means to increase the food supplies of the country. All those who have the opportunity must feel that it is their duty to the State to assist in producing and contributing to the common stock from which everyone draws. If we do this, we get rid of any privation, everyone having plenty of the best and healthiest food.—D. Lloyd George, Prime Minister of England.

THE FRUIT BRANCH

THE SALE OF CANADIAN APPLES IN BRISTOL

BY D. JOHNSON, FRUIT COMMISSIONER

IN the December number of THE AGRICULTURAL GAZETTE there was published an article by Mr. F. H. Grindley, of this branch, dealing with the sale of Canadian apples in Great Britain and containing extracts from a report by Mr. J. Forsyth Smith, Canadian Fruit Trade Commissioner in Great Britain. Mr. Smith's report outlined the general method of sale in British markets with special reference to Liverpool, Manchester, Glasgow and London.

The following information has been received from Mr. H. E. Shallis who is employed at Bristol as Cargo Inspector under the Dairy and Cold Storage Branch, and gives a very good idea of the methods of sale at that port together with interesting information regarding the demand for Canadian apples in the Bristol area.

"Compared with London, Liverpool and Glasgow, the sales of apples at Bristol are not so important. It must be borne in mind that as Bristol is situated in the heart of a large agricultural and apple-producing district, there is not so much call for foreign apples, and as a matter of fact until towards the end of November there is not much demand for foreign varieties at all. After this date, however, there is a steady and continuous demand for both boxed and barreled apples.

"Previous to the war our imports of barreled apples were coming along in good quantities. These were in most cases sent direct through to South Wales. Last year there was a big falling off, and up to the present, our imports have been chiefly boxed apples. Already quite a quantity of

British Columbia and Oregon boxes have arrived here *via* other ports, as shippers are realizing more and more that for a certain quantity Bristol can pay as much as any other market.

"The Bristol and Cardiff markets are the chief distributors to the important districts of the west of England, South Wales and even as far as the Midlands, but these two markets do not feel the demand as much as could be desired, for the simple reason that the buyers in the Midland counties look to Liverpool and the northern markets for their supplies.

"The system of auctioning fruits which obtains in other markets is adopted for Bristol, most of the green fruit being offered at auction. There is no regular sales day, but as a rule the apples are sold on the same day as other produce which is being auctioned. Barrels and boxes of the various varieties and grades are opened up on the morning of the sale so that intending buyers can view the samples before bidding. The sales room is open to all who care to attend.

"As the arrivals of apples into this port are so irregular, quite as many are sold privately as by auction. Very little is done on an f.o.b. basis. The Bristol Fruit Brokers, Limited, handle most of the apples which come into this port and this firm sells by auction as well as by private treaty, according to the requirements of the trade, from time to time. This firm also endeavours to keep the trade well supplied, and usually obtains prices which compare favourably with other markets; in fact, on most occasions more money is realized on this market. The reason for this is that buyers prefer to fulfil their requirements from goods that come direct into the port than by having to fulfil them from other markets, as they not only have to pay the rail carriage from the importing market, but they have the disadvantage of not being able to select their own goods."

THE SEED BRANCH

PAPER PACKET SEED INVESTIGATION, 1916

BY E. D. EDDY, B.S.A., CHIEF SEED INSPECTOR

THE investigation reported in THE AGRICULTURAL GAZETTE of Canada, Vol. III, No. 7, July, 1916, was continued last spring. Over 1,400 samples were collected by seed inspectors and tested at the Ottawa laboratory.

In order that the results might be more readily comparable, only specified varieties of the thirteen kinds of vegetable seeds collected were used. We endeavoured to include in this list standard varieties which are put up by all, or nearly all, of the ten merchants whose seeds were investigated. In addition to securing information on the vitality of the seeds and the quantities supplied, an attempt was made to study the quality of the crop produced. In the following report letters are again used to designate the various firms whose seeds were examined. Each letter represents the same merchant here as in the previous report. Two additional firms were included this season. The main facts brought out by this investigation are presented below in the form of tabulated statements.

GERMINATION

It will be noted from Table I that with some dealers quite a proportion of the packets germinated below two-thirds of the standard for good seed. In this connection it is only fair to state that in some instances the low vitality may be accounted for by the packets being placed under unfavourable conditions after being sent out by the wholesaler.

An encouraging feature of the results is that with most of the dealers the percentage of packets germinating below two-thirds of standard is lower than last year, although the difficulties in procuring good seed were increased. The general average of the results in 1916 is considerably lowered by including the firm designated I, which has been supplying very low grade seed for several years and last season was prosecuted under the Seed Control Act. The following tables indicate the germination test results with seeds from the different firms.:

TABLE I. SUMMARY OF GERMINATION RESULTS

SEEDSMEN	Number of Samples Tested	Per Cent up to and above Standard	Per Cent below Standard but above two-thirds	Per Cent below two-thirds Standard
A	128	38	49	13
B	174	45	46	9
C	198	25	62	13
D	206	29	58	13
E	210	30	59	11
F	286	20	47	33
G	145	19	63	18
H	59	21	39	40
I	196	15	32	53
J	14	50	42	8

TABLE II. AVERAGE GERMINATION OF DIFFERENT KINDS OF SEED
PUT UP BY VARIOUS SEEDSMEN

	A	B	C	D	E	F	G	H	I	J	All	Number of Samples Tested
<i>Beet: Eclipse</i>	88	86	79	77	86	79	59	69	78			86
Flat Egyptian.....	76	82	97	78	79	73	72	59	74			92
<i>Cabbage: Early Jer. Wakefield</i>		93	94		94	75			1		71	63
Early Winningstadt ..	82	81	78	74	85	49	73	80	17	96	72	110
<i>Carrot: Oxheart</i>		53	58	49	64	47			35	58	52	76
Half Long Nantes			56	48	66		56	43	36		51	59
<i>Cauliflower: Ey. Snowball</i>		76	79	71	61	52			54		65	74
<i>Celery: Golden Self-Blanching</i>		53	54	58		52	32		1		42	44
<i>Corn: Stowell's Evergreen</i>	67	76		65		69		66			69	47
<i>Cucumber: Long Green</i>	94	85	94	93	97	92	80	97	85		91	198
<i>Lettuce: Hanson</i>		98		97	98	76		36	85		82	58
Grand Rapids.....	95				98	83		39			79	39
<i>Onion: Large Yellow Danvers</i>	84	72	72	68	85	32	42	52	12	94	61	97
Large Red Wetherfield ..	26	92	64	72	46	31		69	16		52	86
<i>Parsnip: Hollow Crown</i>	40	55	32	57	54	38	84	73	22	49	50	107
<i>Peas: American Wonder</i>	89	77	65	82	61	85	81	90	65		77	156
<i>Radish: French Breakfast</i>		96	80	96	70	91	63	70	89	79	82	91
White Icicle.....	86	97	86	88		89		90	95		90	67
<i>Tomato: Chalk's Early Jewel</i>				97					46		71	15
Earliana.....	87	81	89	90	83		91	59	40		79	69

QUANTITY AND HIGH PRICE OF
PACKET SEEDS

In purchasing seeds in packets a comparatively high price is paid, often several times the ordinary retail price per pound. For example, the average quantity of Eclipse beets supplied per 5c. packet, including all the merchants, was 8.3 grams, (1 ounce-28.35 grams). This is equivalent to \$2.75 per pound. The price per pound in bulk quoted in the same merchants' catalogues for the same season ranged from \$1 to \$1.80 per pound. In the same way the seed of Early Winningstadt cabbage was sold at the rate of \$4.50 per pound in the packets, as compared with about \$2 in bulk. Long Green cucumber seed sold at \$4 per pound in packets, compared with \$1.25 to \$1.50 in bulk; Grand Rapids lettuce for \$5.25, as compared with \$2 to \$3; Red Wethersfield onions \$5.50, as compared with \$2 to \$3; and French Breakfast radish at \$2.50 as compared with 90 cents.

The actual value of the seed itself represents only a small percentage of the total charges paid by the purchaser. The cost of printing, lithographing and filling the packets, freight charges, deterioration in the value of the seed returned to the wholesaler at the end of the season, and the profit of the wholesaler and retailer seem to be the chief items making up the price of packet seeds. The expense of distributing seed in such small quantities is necessarily heavy. However, as is indicated in the last column of table III, the average 5c. packet contains enough vital seeds for the ordinary farm or city kitchen garden, and it is for this purpose that the packets are intended. Those who require an ounce or more of any one kind of seed should by all means buy in bulk.

The average quantity by weight and numbers of different kinds of seed supplied per 5c. packet is indicated in the following table. These figures are based on the average of all the seedsmen's packets examined.

TABLE III. WEIGHT AND NUMBER OF SEEDS IN PACKETS

	Quantity seed Supplied in 5c. Packets (Grams.)		Number of seed Supplied in 5c. Packets	
	Total	Vital	Total	Vital
<i>Beet: Eclipse</i>	8 3	6 4	664	512
Flat Egyptian.....	8.8	6 7	704	536
<i>Cabbage: Ey. Jersey Wakefield</i>	4 6	3 0	1265	825
Ey. Winningstadt ..	5 0	3 6	1375	990
<i>Carrot: Oxheart</i>	4 7	2.5	4230	2250
Half-long Nantes. . .	4 8	2 4	4320	2160
<i>Cauliflower: Early Snowball</i>	0 7	0.4	242	138
<i>Celery: Golden Self-Blanching</i>	3 2	1 3	14880	6045
<i>Corn: Stowell's Evergreen</i>			138	96
<i>Cucumber: Long Green</i> .	5 6	4 9	180	158
<i>Lettuce: Hanson</i>	3 8	3 3	2850	2475
Grand Rapids	4 3	3 4	3225	2550
<i>Onion: Large Red Wethersfield</i>	4 1	2 1	1181	585
Large Yellow Danvers	4 4	2 8	1267	806
<i>Parsnip: Hollow Crown</i>	6 1	2 9	1427	670
<i>Peas: American Wonder</i> ..			137	106
<i>Radish: French Breakfast</i>	9 0	7 3	900	730
White Icicle ..	8 8	8 0	880	800
<i>Tomato: Chalk's Early Jewel</i>	1 9	1 4	1492	1099
Earliana.	2 2	1 8	1727	1413

COMPARATIVE AMOUNT AND RANGE
IN VITAL SEED SUPPLIED

There was a wide range in the quantity of vital seed supplied by different merchants and even by the same merchant in the ordinary five cent packet, as was the case in 1915. For example, the ordinary packet of Stowell's Evergreen corn put out by A contained 122 kernels; B, 157; and D, 62. There was, moreover, a range of 147 between the highest and lowest number of kernels per packet put up by A. The quantity of vital seeds of Large Red Wethersfield onion per packet put up by different merchants varied from 5.19 grams put up by B to 0.93 grams put up by F. The average quantity of vital seeds of Yellow Danvers onion put up by F was 1.1 grams; the lowest quantity in any packet examined was 0.48, the highest 4.8, or a range of 4.32 grams. The variation in the quantity of seed supplied per packet by individual merchants was, however, not less striking than was the variation between different merchants' packets. Some wholesalers' packets

showed considerable range in all the kinds of seed examined. In others the range was excessive in only a few lines.

Details of the average quantity of seed supplied by different seedsmen and the range between the largest and smallest packets are given in Table IV. Where the quantity is given with a decimal point the weight in grams is indicated; where there is no decimal point the figures indicate the number of seeds. The figures opposite A in the horizontal columns represent the average quantity of vital seeds per packet; figures opposite B represent the range in quantity of vital seeds or the difference between the largest and smallest packets examined. The highest average weight of germinable seeds put up by any of the merchants is indicated for each kind of seed by using heavy type; those in italics indicate the lowest. The last two lines of the table summarize the number of cases in which each seedsman's packets contained the largest or the lowest average quantity of vital seeds.

TABLE IV. AVERAGE QUANTITY AND RANGE OF VITAL SEEDS PER PACKET

		A	B	C	D	E	F	G	H	I	J	All
<i>Beet:</i>												
Eclipse	A	5 55	7.10	4 31	5 18	5 13	8.46		3 08	12.16		6 37
	B	3 88	5 86	1 28	2 79	1.35	5.42		1 17	8 89		3.83
Flat Egyptian	A	5.28	7.18	4 74	5.92	4 47	6 94	8.21	3 89	13 28		6.66
	B	3 73	1 32	1 05	4.43	1.17	4 20	3 23	3 82	9 47		3.60
<i>Cabbage:</i>												
Ey. Jer. Wakefield	A		4 98	2 19		3 13	4.68			0.05		3.01
	B		1 92	0 53		1.00	4.06			0 16		1 54
Ey. Winningstadt	A	3 95	4 12	2 21	2 04	3.09	2.93	4 69	2.78	0 87	9 08	3 58
	B	1 81	2 96	0 58	1 10	0 77	2.33	0 90	0 88	0 91	2 08	1 43
<i>Carrot:</i>												
Oxheart	A		5 14	2.31	1 73	2 29	2 01		0 98	3.11		2 51
	B		2 42	1 02	0 66	0 53	0 83		0.26	3 64		1 34
Half-long Nantes	A			2 28	1 85	2 41		4 02	1.18	2 81		2.42
	B			0 66	0 61	1 52		3 90	0.18	5 57		2 07
<i>Cauliflower:</i>												
Ey. Snowball	A		0 56	0 27	0 73	0 37	0 16			0.50		0 43
	B		0 62	0 12	0 25	0 32	0 17			0.76		0 37
<i>Celery:</i>												
Golden Self-blanching	A		2 40	1 34	0 65		1.75	1 51		0 01		1 28
	B		0 71	1.58	0 23		1.61	0 54		0 04		0.78
<i>Corn:</i>												
Stowell's Evergreen..	A	1.22	1 57		62		66		75			96
	B	1.47	45		19		1.12		17			68
<i>Cucumber:</i>												
Long Green	A	5 04	6 44	3.77	4.61	3 65	5.23	4 67	3 52	6 09		4 78
	B	5 81	3 55	1 16	1 61	0 89	3 47	3 88	1 41	4 23		2 86
<i>Lettuce:</i>												
Hanson	A		4 35		2.77	2 85	3 86		2 87	2.95		3 27
	B		1 28		0 49	0 43	1 11		2 99	1 76		1 34
Grand Rapids	A	4 09				2 75	5 26		1 39			3.37
	B	1 97				0 43	1 22		0 82			1 11
<i>Onion:</i>												
Large Yellow Danvers.	A	4 22	4 10	2 85	1.99	2 52	1 10	2 33	1.18	0 69	6.52	2 75
	B	3 26	1 63	1 25	1 23	0 51	4 33	0 87	0 33	2 36	0 40	1 62
Large Red Wethersfield	A	1 22	5 19	2 21	2 22	1 56	0 93	2 34		1 02		2.09
	B	4 44	1 11	1.07	0 56	3 14	1.59		0.10	3 91		1 99
<i>Parsnip:</i>												
Hollow Crown	A	1 49	3 34	1 52	1 84	1 87	2.39	4 48	3 75	2 80	5 08	2 86
	B	1 60	2 65	2.07	1 43	0 63	2 77	1 02	0.26	4 36	2.19	1 90
<i>Peas:</i>												
American Wonder	A	1 03	1 64	64	111	53	102	126	91	140		106
	B	39	12	86	70	81	119	126	41	108		76
<i>Radish:</i>												
French Breakfast	A		8.38	6 42	6.37	4 01	6 00	4 07	10.22	9.84	10.44	7 31
	B		0.85	1 51	0 42	0 77	5 39	1 03	1.77	6.73	2 05	2 28
White Icicle	A	6.42	8.59	6.94	5.80		5 85		12.41	9.80		7 97
	B	2 46	1 56	0 80	1 42		3.54		1 97	4 94		2 38
<i>Tomato:</i>												
Chalk's Early Jewel.	A				2.10					0.75		1.43
	B				1 44					0.40		0 92
Earliana	A	1 68	1 86	1 22	2 20	1.04		4.18	1 34	0.66		1 77
	B	2 22	0 69	0 43	0 78	1.68		1 01	0 32	0 68		0 98
Number of varieties showing the largest quantity of germinable seeds.		0	8	0	2	0	1	2	1	2	4	
Number of varieties showing the smallest quantity of germinable seeds.		1	0	0	3	2	2	0	6	6	0	

QUALITY OF CROP AND FIELD TESTS

It should be remembered that the above results take into consideration only such qualities as can be determined in a seed laboratory and do not take into account the very important factor of the comparative quality

giving much better value; or it may be that the merchant supplying the larger quantity of seed is also putting up the best stock from the standpoint of trueness to type and general quality.

In the spring of 1916 an attempt was made to conduct field tests with some of the seeds which had been examined in the laboratory. Unfortunately on account of the very unfavourable season, the growing tests were not very satisfactory. No definite information was secured on the field germination of the different kinds of seeds and several of the kinds of vegetables failed to reach a stage of maturity sufficient to warrant us in drawing any conclusions. With some kinds, however, we got definite and convincing evidence of the poor quality and serious mixture of varieties or types put up by some dealers.

Following are some of the field notes made on the crop at harvest time. The letters used designate the different seedsmen the same as in the above tables:

Oxheart Carrot:—

B. A fair proportion of good type but two other distinct types present, a few double rooted and some dwarfed and wrinkled.

C. Fairly high percentage of Oxheart type but a few somewhat off-type and some of Nantes shape present; no long slim roots; mixture of types not particularly bad.

D. Bad mixture of types including some of distinctly light-

er colour, some very long slim and some parsnip-shaped roots; a small proportion of badly shaped and rooty types. The photograph reproduced herewith (Fig 1) is of six carrots from this lot. These are not extremes; there were several roots of each type illustrated.



FIG. 1. TYPES OF ROOTS PRODUCED FROM OXHEART CARROT SEED FROM PACKETS PUT UP BY THE SEEDSMAN DESIGNATED "D"

of the crops which the different stocks of seed would produce. It is possible that on account of the superior quality of the crop produced, the merchant supplying the smaller quantity of vital seeds may be

E. One white and one double-rooted, as a whole more tapering than the standard.

F. Types badly mixed, a few slim ones, types more distinct than in D's.

I. Large proportion off type, a few of Oxheart type but most tapering parsnip-shaped. Some dwarfed and wrinkled.

Nantes Carrots:—

C. Type good, a few tapering roots.

Flat Egyptian Beets:—

A. A sprinkling of green top, light-coloured roots and some tapering, mostly of good type.

B. Type good, none badly off type.

C. Type good, no noticeable mixture.

D. General average tends to round but no distinct mixture.

E. A large percentage of round and tapering type with a sprinkling of light-coloured roots.



FIG. 2. TYPES OF ROOTS PRODUCED FROM NANTES CARROT SEED FROM PACKETS PUT UP BY THE SEEDSMAN DESIGNATED "1"

D. A fair proportion of good type. Some too tapering and an odd one of Oxheart type.

E. Type very fair for uniformity but apparently a little tapering. Quite a proportion of long slim tapering, a sprinkling off-colour light roots.

I. Some small wrinkled roots, a very small proportion typical Nantes and many of the other types; a great range in size. (See Fig. 2).

F. High proportion of green-topped, lighter-coloured round, tapering type. Many badly shaped roots. Only a sprinkling of flat type. (See Fig. 3).

G. A few round tapering types but mostly flat.

I. Poor stand. At least half more of globe type than flat.

Eclipse Beets:—

A. A slight mixture of roots with light-coloured flesh, general type good.

- B. Type good.
- C. Type good.
- D. Tendency to be tapering.
- E. Some of flat type; otherwise good.

F. About one-half of light-topped and light-coloured flesh; some flat mixture of varieties noticeable 75 yards away.

I. A few light coloured ones of mangel type, otherwise type fair.



FIG. 3. TYPES OF ROOTS PRODUCED FROM FLAT EGYPTIAN BEET SEED FROM PACKETS PUT UP BY THE SEEDSMAN DESIGNATED "F"

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE OFFICERS AND EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE WHO HAVE ENLISTED FOR OVERSEAS SERVICE

INSIDE SERVICE

M. J. Moloughney, Entomological Branch, Ottawa.

OUTSIDE SERVICE

J. Fraser, Experimental Farm, Agassiz, B.C.
Andrew Pollock, Experimental Farm, Agassiz, B.C.
Luigi Tonellato, Experimental Farm, Agassiz, B.C.

CASUALTIES

R. H. Neeley, Experimental Farm, B.C. (Reported Missing.)
E. W. Painter, Dairy & Cold Storage Branch, Ottawa. (Died.)

PART II

Provincial Departments of Agriculture

LAND DRAINAGE

It would be difficult to estimate with accuracy the value of underdrainage on the crop production of Canada. Few farmers who have adopted it but can tell of areas previously useless that are now among the most productive parts of their farms. The provincial Departments of Agriculture are therefore justified in the efforts they are putting forth to encourage the general adoption of underdrainage. The federal Department is equally awake to the value of this branch of agricultural practice. As shown by the table of federal appropriations under THE AGRICULTURAL INSTRUCTION ACT for the present year recorded in the September number of The Agricultural Gazette for 1916, upwards of \$25,000 is being expended in drainage demonstrations throughout Canada. The following series shows what most of the provinces are doing with federal and provincial funds to demonstrate and to otherwise encourage underdrainage.

PRINCE EDWARD ISLAND

BY W. R. REEK, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

THE Department of Agriculture secured, in the fall of 1915, all the available tile on the Island for the demonstration field; during 1916 none was imported and no further work could be done.

Oats were sowed in the demonstration field in May, 1916. This field had yielded no crop for several years previous, because of the water-soaked condition of the soil; it was poor and inclined to be sour. The surface drainage was excellent, but the hard-pan bottom prevented any drainage below and the precipitation was so heavy that evaporation did not take care of the surplus. The part drained constituted but half of a field. The yield was 98 bus. 10 lb from 3.86 acres. The undrained part yielded no crop during 1916. The total yield, though small, can be credited to the underdrainage, because no fertilizer was applied. The cost of installation was \$21.15 per acre. Proper manuring and cultiva-

tion will ensure normal crops.

Practically no serviceable surface drainage had been undertaken in the province previous to last summer. The farmers in the Mt. Carmel section working under the provisions of the Drainage Act constructed a large open drain and areas that were scarcely ever dry have been thoroughly drained, with the result that requests for assistance from other districts have been filed.

Previously, no tile had been manufactured upon the Island. The clay had been tested and pronounced excellent. A company, with a capital of \$25,000, of which \$5,000 is paid up, was formed, for the purpose of manufacturing tile and brick. A modern plant now stands complete near Richmond. Eighty thousand brick and a few tile have been made.

Drainage surveys have been made in several sections. Unlike some of the other provinces, the Department will send the surveyors over the sec-

tions where the tile are being installed to prevent any errors occurring in the installation. Experienced ditchers are not to be had.

The first drainage Act was passed at the session of the legislature in 1916. Provision is made whereby money will be loaned to farmers for the purchase of tile, but such loan

cannot exceed \$14 per acre. The necessary provisions for securing outlets and for the prosecution of the work are the major portions of the Act.

The Tile and Brick Co., under arrangements, agrees to allow the Department of Agriculture to set the price of tile.

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

FOR the past six years the Department of Agriculture has done considerable work to promote farm drainage. A power ditching machine was operated for four years up to 1914, and we have numerous reports indicating the advantages that have followed the underdrainage of the lands on which this machine did work.

However, with the outbreak of the war every man connected with the Drainage Department enlisted, and in September last, Lieutenant B. H. Landels, who was at the head of this Department, was killed in action. On this account we have not the same exact returns which we have formerly been able to present. It is sufficient, however, to say that no person in Nova Scotia seems to

doubt the advantages of underdrainage, which is particularly important in a province where the rain fall is as heavy as it is in Nova Scotia. The question of real import is how to get the work done. The problem yet remains to be satisfactorily solved. The difficulty in the way of solving this problem in the province is the scarcity of labour, which makes the old method of digging drains by hand a most impossible one. Nor has the power ditching machine entirely solved the difficulty, for, in general, the jobs on each farm are not of as extensive a character as in other parts of Canada. However, everything points to better conditions after the war.

NEW BRUNSWICK

BY J. B. DAGGETT, SECRETARY FOR AGRICULTURE

THE campaign for the encouragement of tile drainage in New Brunswick, as outlined in THE AGRICULTURAL GAZETTE, Vol. 1, 1914, August, page 659, was continued during the season of 1916. Notwithstanding the loss of some members of our staff,—due to enlistment for overseas service, which caused a considerable doubling up of work and made it impracticable to prosecute this, as well as other lines, as actively

and extensively as would otherwise have been possible,—yet considerable work was accomplished. During the season the traction ditcher operated upon 11 farms. The total length of drains placed was about 1,600 rods.

The one great difficulty with which we have had to contend is that of obtaining tile at a reasonable price. Farmers on whose properties tiles have been laid by means of the

traction ditcher, under the supervision of the Department, during the past three years have been communicated with and some of the replies, giving their opinions of the value of the work done, follow:

Clyde Rideout, Carleton County:

"I am very well pleased with the tile drain. The drains are full of water after every heavy rain, and the ground dries off very quickly. The crops are double what they were before drainage."

In the fall of 1913 the traction ditcher was operated on Mr. Rideout's farm, digging 270 rods of ditch which drained some 35 acres of land. In 1914, an excellent crop of potatoes was harvested. In 1915, the field yielded over 2,700 bushels of oats, and in 1916 it cut about 60 tons of good hay, and on the 14th of September, 1916, the entire field was covered by a beautiful stand of clover. In 1913, this field only yielded some ten loads of inferior hay.

John Ward, Queens County:

"The ditching done on my farm has proven very satisfactory. Land that was worthless before being ditched is now the best on the farm. In order to make farming a success underdraining must be done."

George Raymond, Kings County:

"The work done by the Government ditcher on my farm in the years 1915 and 1916, has been quite satisfactory. The land drained in 1915 has already shown a most decided improvement as a considerable portion of it would not carry a team before draining."

James Gilchrist, Kings County:

"The work done by the Government ditching machine in the summer of 1915 has been very satisfactory. There was one spot of about half an acre in the centre of a nice field, which was not only useless for cropping but spoiled the appearance of the whole field of four acres and made it very inconvenient for ploughing and cultivating, but since the tile drains were laid we have worked right through these wet places and had a good crop of grain on it this last season, and the general appearance of the whole place is very much improved. In another field, at the foot of a hill, which was so wet from surface water that we

could only cultivate it in an occasional dry season, with the ditcher we ran a drain right up around the foot of the hill and sloped the sides by hand, which was a very easy matter, by this means cutting off the whole supply of water. Last year we ploughed this field and had a fine crop of grain on it. Below the ditch the ground was hard and good to work, but above the ditch the horses would get swamped. Both these places are near the highway and have been very much commented on as object lessons of what drainage will do for land."

Cyrus Vanwart, Carleton County:

"I am well satisfied with the drainage work. I believe it will repay its cost in about four years of grain and hay, but for roots or hoe crops it might not take that long. My draining was done so late in the fall of 1914 that I could not get the land ploughed, so in 1915 it was in hay on the old sod but there was about three times as much of it as there had been for a few years previous. In 1916, I sowed it to oats and had a good crop with no trouble to work it where before some parts were so soft that I could not take my team on them. The soil broke up early and made a good seed bed instead of being baked and lumpy as before."

W. J. Kent, Gloucester County:

"The work done by your ditching machine was certainly of much profit to us, as the land drained can now be gone over any time in summer, no matter how wet, and the crop is about 100 per cent better than it was previous to draining."

A. G. Turney, Sunbury County:

"In August, 1915, the traction ditcher dug some 250 rods of ditch in a five-acre field that was wet and springy in many places, and from which no crop at all had been harvested for years owing to the worn-out and water-logged condition of the soil. We were able to plough the entire field that fall and this spring planted an acre of it successfully to raspberries and oats. The balance was sown to buckwheat which was ploughed under. It was only a fair crop, due more I think to lack of fertility than anything else, but still we had a crop as compared with none before. I believe that the field will yield good returns as soon as the fertility of the soil has been restored by means of ploughing under green crops and applying barnyard manure. This was made possible by the laying of the drains."

W. W. Hubbard, Experimental Station, Fredericton.

"The work done by the Government steam ditcher was the most economical that we have had done on the Experi-

mental Station. The year following the ditching we planted the land to potatoes without any manure and got an average of 214 bushels per acre. We then laid down the area to fertilizer plots with potatoes and got remarkably good yields varying

according to the fertilizer applied. Last year the land was in oats and yielded an average of about 50 bushels per acre with a splendid catch of clover over the field. This land was almost worthless before being drained."

QUEBEC

BY F. N. SAVOIE, B.S.A., SECRETARY, DEPARTMENT OF AGRICULTURE

THE policy of encouragement to underdraining, inaugurated several years ago by the Quebec Department of Agriculture was continued in 1916. Nine instructors, French and English, were kept at the disposal of farmers who desired to underdrain their land; the farms were surveyed and a plan of drainage, showing the situation and the depth of tiles to be set, the slope and the size of tiles to be used for each drain, were prepared free of charge.

Such plans were accompanied by an approximate revaluation, showing the cost of laying the whole system and the cost per acre.

The nine instructors employed in this work divided the work among themselves as follows:

Two instructors helped the operator of each of the ditching machines.

Four instructors prepared plans for the farmers.

Two instructors made ink copies of the plans prepared in the rough.

From the 6th May to the 31st of October, 84,430 feet of trenches were dug on nine different farms by the two ditching machines. These machines were stopped during 107½ days on account of various causes, chiefly the difficulty experienced in

the transportation of tiles; this is a difficulty which deserves serious consideration from an economic point of view. The ditching machines lost 51½ days waiting for tiles which had been ordered one month ahead.

The four instructors in charge of the plans surveyed from the 1st of May to the 15th of October, an area of 2,377¼ acres, on 74 farms. They also visited several farms where they were not able to prepare a systematic plan of drainage. In such cases they would give the farmer practical advice as to the construction of one or two drains which would be sufficient for the drainage of a wet spot.

Up to the present, the work of the Quebec Department of Agriculture has been limited to the preparation of plans and to the running of the two ditching machines owned by the Department. Several reports from enthusiastic farmers were received, showing the advantage of underdraining as regards the earliness of seeding, the vigour of growth and the increase of yield, but no systematic experiments have as yet been attempted on drained and undrained soil, under similar conditions.

It is hoped that such work may be carried out in certain parts of the province, where the need of underdraining is most acutely felt.

ONTARIO

BY J. R. SPRY, B.S.A., IN CHARGE OF DRAINAGE DEPARTMENT, ONTARIO
AGRICULTURAL COLLEGE

THE wet fall of 1915 which resulted in much crop being unharvested, followed by the wet spring of 1916 when many acres were untilled, have furnished ample proof of the need of better drainage in many districts of Ontario. A record in drainage activity would be established during 1917 if sufficient labour were available to carry to completion the open ditch work and underdrainage schemes now planned for the season soon to open. Lack of labour in many instances, and a shortage in tile supply in others, have been the limiting factors in drainage activity, especially in the counties of south-western Ontario. At the present time many yards are refusing contracts for the spring delivery of tile.

Increased financial aid has been given drainage by the Provincial Government through an amendment to the Tile Drainage Act, which now places at the disposal of the municipalities of the province for underdrainage purposes a sum not to exceed at any one time \$500,000. Previously, the amount available for the purchase of drainage debentures under this Act was limited to \$200,000. Another change in this Act of importance to the municipality planning to obtain a drainage loan is that covered by amendments of 1914 and 1916 which have increased the borrowing power of any municipality from \$10,000 to \$50,000. Other minor changes in the drainage laws have been made.

As a whole, drainage laws affecting financial aid to the individual farmer are much more satisfactory than heretofore.

During the past year in pursuance of the policy adopted in 1906 the Ontario Agricultural College has directly assisted the land owner in his drainage work by surveying 318 proposed drainage schemes. This number of surveys covers an area of 14,694 acres, about 50 per cent of the total acreage underdrained during 1916.

Five demonstration drainage plots were installed during the past year. All five plots are located on a soil type described by the Soil Survey Branch of the Ontario Agricultural College as "London Loam," a large area of which is found throughout the province of Ontario. These five plots represent gradations within the type and the results obtained should be of considerable value in future drainage operations on this kind of soil.

The results for the past season from the demonstration plots installed previous to 1916 are very gratifying. A summary of the reports will be given. In arriving at the value of the various yields wheat is valued at one dollar and thirty cents per bushel, oats at fifty cents per bushel, barley at eighty cents and hay at eight dollars per ton. In the case of the grains no account has been taken of the value of the straw.

RESULTS FROM DRAINAGE ON LOAM SOILS

Plot	Post Office	County	Crop	Yield per Acre in Bushels		Bushels Increase	Value of Increase per Acre
				Drained	Undrained		
1	Glanford	Wentworth	F. Wheat	25 4	15 0	10 4	\$13 52
2	Cayuga	Haldimand	F. Wheat	23 0	11 0	12 0	15 60
3	Harrowsmith	Frontenac	Oats	26 6	5 7	20 9	10 45
9	Belleville	Hastings	Barley	26.0	12 2	13 8	11 04
4	Stewart's Hall	Peterboro	Hay	2 65 tons	1 20 tons	1 45 tons	11.60

This table shows an average increase due to drainage of \$12.44 per acre, an amount exceeding one-third the total cost of installation of the drainage system, not only on the average, but in each individual case. If the money had been borrowed at 5 per cent and on the amortization plan as provided for

by the Tile Drainage Act each acre would have met the annual payment on the original investment and have given the owner a clear profit of \$9.77.

On clay soils the results do not show such a large increase due to underdrainage.

RESULTS FROM DRAINAGE ON CLAY SOIL

Plot	Post Office	County	Crop	Yield in Bushels per Acre		Increase in Bushels	Value of Increase
				Drained	Undrained		
5	Beachburg	Renfrew	S. Wheat	15 76	11 82	3 94	\$5 12
6	Stevensville	Welland	F. Wheat	25 0	22 10	2 9	3 77
7	Hagersville	Haldimand	Oats	32 7	22 4	10 3	5 15
8	Norval	Halton	Oats	27 1	38 3	8 8	4 40

On clay soils the average increase per acre amounted to \$4.61, which compared with the returns from the loam soil shows a decrease in benefit of \$7.83. The return from the clay soils although much smaller than that from the loams still gives the owner a profit per acre of \$1.94,

after paying the annual levy for sinking fund to meet principal and interest on money invested.

Our work with heavy clay soils has presented many problems, the solution of which has not been arrived at as yet. The following table shows the results in crop yield for 1916.

RESULTS FROM DRAINAGE OF HEAVY CLAY SOILS FOR YEAR 1916

Plot	Post Office	County	Crop	Yield per Acre in Bushels		Increase per Acre	Value of Increase per Acre
				Drained	Undrained		
10	New Liskeard	Temiskaming	Peas	42 0	42 0	0 0	0 00
12	Rainham Centre	Haldimand	Hay	?	?	0 0	0 00
13	Inglewood	Peel	Hay	3 04 tons	3 02 tons	0 02	0 00
14	Hornby	Halton	Barley	20 00	20 0	0 0	0 00

No increase due to drainage on heavy clay soils is shown by this table.

In 1915, plot 10 reported an increase due to drainage of ten bushels of oats. Plot 12, during the years, 1914, 1915, 1916, has returned reports showing no crop increase for drainage. Plot 13 gave a negative report for 1915 and 1916. Plot 14 was installed during the fall of 1915 under very unfavourable conditions.

The drainage of our loam soils presents few problems. The clays,

especially those having an open subsoil, are almost as easily drained, and the drains will give more efficient drainage with each succeeding crop, resulting in increased crop yields. Our results would indicate that the drainage of the heavy clays is closely associated with problems of cultivation, which demand careful investigation before drainage methods producing results comparable with those obtained on lighter soils can be obtained.

BRITISH COLUMBIA

BY H. O. ENGLISH, B. A., B.S.A., CHIEF SOIL AND CROP INSTRUCTOR

LAND drainage is the problem confronting many British Columbia farmers. Thousands of acres of good agricultural land have been reclaimed by dyking systems in some of the coast districts, while in other districts the rock and soil formations are such as to render some system of drainage necessary.

Prior to 1916 the Department did no actual underdrainage. In 1916, a ten-acre plot of dyked land was underdrained with three-inch tile. The only data of value in connection with this project is that relative to the cost. The drains varied in depth from two to three feet.

Owing to the nature of the soil, most of the ditching had to be done by hand. The cost of ditching, laying tile, and filling ditches averaged \$1.65 per chain, or 41½ cents

per rod. The cost of 3-inch tile, f.o.b., local station was \$20 per thousand feet.

We have no comparative data at hand which show the value of underdrained land as compared with undrained land in British Columbia. There is abundant evidence in the Coast districts in favour of underdrainage, but no actual figures have as yet been obtained.

The Department is planning to demonstrate the value of underdrainage in various districts during 1917. The most popular ditching machines on the market will be tested out under expert supervision and under varying soil conditions to ascertain if possible the adaptability of each to local conditions. At the same time, an attempt will be made to ascertain the actual cost of underdrainage in such districts.

The Smith Lever Act of the American Republic, like THE AGRICULTURAL INSTRUCTION ACT OF CANADA, provides for the employment of women for the promotion of home economics work. In the United States no less than four hundred and seventy-eight women are engaged as County Agents, working under the federal measure. The majority of these operate in the Southern States. Under the Smith Lever Bill \$755,990 are available for this branch of the work.

SPRAYING EXPERIMENTS

The results from spraying fruits during the season of 1916, in many cases, proved unsatisfactory, owing, largely, to the unfavourable climatic conditions. A number of new sprays and new methods of applying them were tried at some of the experimental stations in Canada. The following is an endeavour to bring together the special lessons that have been learned from the experiments conducted at the various experimental stations in Canada, laying emphasis on materials used, how often and how applied, and what materials gave the best results in controlling insect and fungus attacks during the past unusual season.

NOVA SCOTIA

BY W. H. BRITTAIN, B.S.A., PROVINCIAL ENTOMOLOGIST

DURING the summer of 1916 the Division of Entomology of the Department of Agriculture of Nova Scotia conducted a large number of spraying tests against two orchard pests, viz., the apple maggot (*Rhagoletis pomonella* Walsh) and the green apple bug (*Lygus communis* var. *novascotiensis* Knight). The results of the work, from the standpoint of the control of these particular pests, are being published as special bulletins of the department, but during the course of the investigation certain facts of interest were observed, aside from the main object of the experiment, that may be worthy of record.

SERIES I

Under this series will be considered the results from four orchards sprayed under the direct supervision of the writer and two that were sprayed

by private growers. The various combinations were applied four times in all at the following periods:

First Spray.—When the leaf buds were just beginning to open out.

Second Spray.—Just before blossom petals opened.

Third Spray.—Just after the blossom petals fell.

Fourth Spray.—Two weeks later than third spray.

Table No. I summarizes the treatment given the different orchards. Numbers one to four inclusive were those sprayed under the direction of the writer, the others by the owners themselves. Where lime sulphur was used the dilutions given are for the ordinary commercial product, testing 33° Beaume. A power outfit was used in all the orchards except No. 4, where only an ordinary barrel pump was available.

TABLE NO. I. TREATMENT GIVEN DIFFERENT EXPERIMENTAL ORCHARDS

No. of orchard	MATERIAL USED	DILUTION OF FUNGICIDE				Dilution of Arsenical Poison	REMARKS
		1st Spray	2nd Spray	3rd Spray	4th Spray		
1	Lime sulphur and arsenate of lead paste.	1 gal. to 45 of water.	1 gal. to 50 of water.	1 gal. to 60 of water.	1 gal. to 65 of water.	2 lb. to 40 gals. of water throughout.	Power outfit used.
2	Soluble sulphur and arsenate of lime (powdered).	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	$\frac{3}{4}$ of a lb. to 40 gals. water throughout.	Power outfit used
3	Barium sulphur and arsenate of lime.	3 lb. to 40 gals. water.	3 lb. to 40 gals. water.	3 lb. to 40 gals. water.	3 lb. to 40 gals. water.	$\frac{3}{4}$ of a lb. to 40 gals. water throughout.	Power outfit used.
4	Soluble sulphur and arsenate of lime (powdered).	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	$\frac{3}{4}$ of a lb. to 40 gals. water throughout.	Hand outfit used and less thorough work than in preceding orchards.
5	Bordeaux mixture and arsenate of lead paste.	$3\frac{3}{4}$ lb. copper sulphate, 30 lb. lime, 100 gals. water.	$3\frac{3}{4}$ lb. copper sulphate, 20 lb. lime, 100 gals. water.	$1\frac{3}{4}$ lb. copper sulphate, 20 lb. lime, 100 gals. water.	$\frac{1}{4}$ lb. copper sulphate, 20 lb. lime, 100 gals. water.	1 $\frac{3}{5}$ lb. to 40 gals. water throughout.	Power outfit used. The Bordeaux much weaker than ordinary formula and excessive quantity of lime added.
6	Soluble sulphur and arsenate of lead.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	1 lb. to 40 gals. water.	$\frac{3}{4}$ lb. to 40 gals. water throughout.	Power outfit used.
6	Lime sulphur and arsenate of lead paste.	1 gal. to 33 of water.	1 gal. to 37 $\frac{1}{2}$ of water.	1 gal. to 43 of water.	1 gal. to 45 of water.	2 lb. to 40 gals. water throughout.	Power outfit used.

Table No. II summarizes the results obtained. In this table Gravensteins are used as a basis for comparison, since this variety was found in all orchards and is very suscep-

ble to apple scab. For the convenience of the reader, the spraying solution used in each orchard is repeated in this table.

TABLE NO. II

Orchard No.	MATERIAL USED	NO. OF INJURIES FROM DIFFERENT PESTS										Total No. Counted	Percentage Clean	REMARKS
		Apple Scab	Rust	Bud-Moth	Apple Bug	Codling moth	Black Rot	Apple Maggot	Aphis	Fruit Worm	No. Clean			
1	Lime sulphur and arsenate of lead.	41	12	7	40	4	20	20	6	2	1846	2000	92.3	Yellowing of leaves on some trees pronounced. Only a few Gravensteins in this orchard. The high maggot count should not be considered since we did not do the same effective work against this pest as in preceding orchards. Considerable leaf yellowing from last spray.
2	Soluble sulphur and arsenate of lead.	35	2	23	8	1	20	14	1	5	801	1000	80.1	
3	Barium sulphur and arsenate of lime.	10	0	5	10	2	29	36	0	2	106	200	53	
4	Soluble sulphur and arsenate of lime.	270	0	12	12	4	121	6	31	14	530	1000	53	Hand outfit used. Spray caused considerable yellowing and premature drop of leaves.
5	Bordeaux and arsenate of lead.	12	0	6	1	0	0	0	4	3	170	200	85	Some yellowing of leaves from last spray
6	Lime sulphur and arsenate of lead.	12	0	0	0	0	6	0	0	0	181	200	90	
6	Soluble sulphur and arsenate of lime.	27	0	2	0	0	3	0	0	16	152	200	76	

The results shown in the table are not necessarily conclusive, since they are only the result of a single season's work. Furthermore, while orchards numbers 1, 2 and 3 were sprayed on the same dates by the same man and under similar conditions, this was not true of the other orchards. We were not able, in all cases to make as large counts as we would have wished. In general, however, these results coincided with those observed elsewhere throughout the Annapolis Valley, and they are here described as a matter of record.

In the foregoing experiments soluble sulphur (*sodium sulphide*) and barium sulphur (*barium sulphide*), two dry powdered substitutes for lime sulphur appear to be inferior to that preparation in fungicidal value. The soluble sulphur in many cases seemed to cause considerable yellowing and premature dropping of the leaves. This was not noticed after the first two sprays but became apparent after the third and fourth. Soluble sulphur used alone throughout the season caused little injury in most cases, but where poison was added pronounced injury almost invariably developed. The same held true, but not to the same extent, of barium sulphur.

SERIES II

Two orchards are considered under this heading, both sprayed under the immediate direction of the writer. These orchards were severely infested by the green apple bug and were given two very heavy drenching sprays with nicotine sulphate, applied at a pressure of two hundred pounds or over. It was found that where it was necessary to use the heavy drench required for this work,

the lime sulphur in combination with which the nicotine sulphate was used, caused serious injury to the foliage and blossoms. Consequently more dilute solutions were tested.

Orchard No. 1 was sprayed before the blossoms at an average strength of 1 to 45 of lime sulphur and after the blossoms at an average strength of 1 to 60 of lime sulphur, arsenate of lead, 1 pint to each 40 gallons, and nicotine sulphate, 1 pint to 100 gallons, being added in each case. Flour paste at the rate of 3 to 100 gals. was added to the second spray. In the case of Orchard No. 2 the lime sulphur was used in the first spray at an average strength of 1 to 65 of lime sulphur, arsenate of lead and nicotine sulphate being added as before. In the second spray, soluble sulphur was employed in the strength of 1 pound to 40 gals. of the spray. No poison was added to the solution, but, in addition to the nicotine sulphate, soft fish oil soap at the rate of 2 gallons per hundred was added to the mixture. In both these orchards which consisted of mature trees of large size, an average of 12 gals. per tree was applied before the blossoms and 16 gals. per tree after the blossoms. No other spray was applied to either orchard, except the Gravensteins of No. 1, which were given a third spray.

Tables No. III and IV show the amount and condition of the crop in previous seasons and for this year as well. Table No. V shows the injuries from the different pests, which accounts for a proportion of the fruit going into the lower grades. Both these orchards had been sprayed in previous seasons, but we have no certain information as to how the work was done.

TABLE NO. III. STATEMENT OF CROP PRODUCED IN ORCHARD NO. 1

YEAR	No. BBls. Nonpareils	No. BBls. Other Varieties	Total No. BBls. Produced	No. BBls. 1's and 2's Packed	Per Cent of 1's and 2's Packed	No. BBls. 3's	No. BBls. Culls	Per Cent of 3's and Culls
1911	38	no record						
1912	8	"		248		146		
1913	none	"		121		96	not counted	
1914	none	270	270	173	64 per cent	64	33	46 per cent
1915	none	115	115	53	46 per cent	53	9	64 per cent
1916	11	342	353	282	80 per cent	67	4	20 per cent

TABLE NO. IV. STATEMENT OF CROP PRODUCED IN ORCHARD NO. 2

YEAR	No. BBls. Nonpareils	No. BBls. Other Varieties	Total No. BBls. Produced	No. BBls. 1's and 2's Packed	Per Cent of 1's and 2's Packed	No. BBls. 3's and Culls	Per Cent of 3's and Culls
1911	550	850	1400	840	60 per cent	560	40 per cent
1912	30	370	400	200	50 "	200	50 "
1913	40	360	400	80	20 "	320	80 "
1914	10	490	500	150	30 "	350	70 "
1915	11½	448½	450	60	13½ "	390	86½ "
1916	121	625	746	592	79 4 "	154	20 6 "

The fruit in these two orchards, though sprayed only twice and with weaker dilutions than ordinarily employed, yielded cleaner fruit than the average orchard in their respective districts that were sprayed three or four times with the regular strength of fungicide. This seems to indicate

that, under certain conditions, it may be possible to use successfully much weaker dilutions than are ordinarily employed, provided that excessive quantities are used and the work is done with extreme thoroughness.

TABLE NO. V. SHOWING INJURY TO FRUIT FROM VARIOUS PESTS

Orchard No.	Variety	Amount Counted	Green Apple Bug	Apple Scab	Fruit Worms	Bud-moth	Codling Moth	Aphids	Tussock Moth	Miscellaneous	Clean
			Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
1	Gravenstein.	5000 apples	1 2	3 7	1 04	64	16	08	06		93 12
1	Pears	52 bushels	7 69								93 12
1	Nonpareils.	2500 apples	2 2	06	1 36	1 2	068	04	02		93 36
2	Gravensteins.	1500 apples	1 46								98 54
2	Kings	1000 apples	2 2	12 2	0	8	2	0	0	9 4	77 4
2	Nonpareils.	100	6 4	3 8	2	1 8	2	0	0	7	82

QUEBEC

BY J. H. LAVOIE, CHIEF OF THE HORTICULTURAL DIVISION

WITH the marvellous development of commerce, the tremendous increase in transportation that have brought about, during the last fifty years, such a marked change in the physiognomy of Canada, it was inevitable that a multitude of new enemies of cultivated plants should be introduced into our country.

On account of its geographical configuration and climate, the province of Quebec has not, perhaps, suffered as much in this respect as the other provinces. Nevertheless there are with us, and sometimes in great numbers, insects and diseases attacking almost all sorts of plants. The list of these new species increases from year to year; the losses

which they cause are continually becoming more serious; again, the presence of other and very dangerous species has been reported near our boundaries. But the most efficient means of control are used and have been used for some considerable time, and steps are being taken everywhere to prevent the invasion of other species. For, it can be truly said that if the province of Quebec was one of the last to be infested, it was one of the first to profit by the beneficial discoveries of the French scientists Millardet, Grison and Moulton.

It was in Abbotsford, Rouville county, under the supervision of Prof. Craig, in 1890, that Bordeaux mixture, the formula of which had been found by Millardet in 1885, was tried for the first time in Canada.

Heretofore, other chemical products and formulæ recommended in France had been used, but in these experiments carried out under Professor Craig, the Bordeaux mixture showed such a superiority over other fungicides that the best fruit growers of the Island of Montreal have used it ever since 1894, and its use has since become general.

To convince the farmers of the necessity of spraying in order to obtain sound fruit, a thorough campaign of education was started at that time by the Government.

Experiments conducted in our demonstration fields, stations and orchards, with Bordeaux mixture and Paris green, or with lime sulphur (Grison water) and arsenate of lead in 1910, and again with sulphate of nicotine in 1914, showed conclusively that fungi, as well as biting and sucking insects, can be checked.

The advantages of spraying having been demonstrated, the Department then took steps to help those who desired to spray by enabling them to procure the necessary material at a reasonable cost.

Thus the Department adopted the policy of contributing half the

price of spraying machines, when the latter were purchased through an agricultural association, the machine to remain however the entire property of the association. Furthermore, an agreement was made between the Department and certain manufacturing firms, whereby a discount of 25 per cent was granted to the members of associations for the purchase of such material.

Such advantages could not fail to produce excellent results. There are now counties in the province where most of the members of associations have spraying machines at their disposal. This year, we had to pay half the purchase price on 337 spraying machines, two of which were spray-motors.

Unfortunately, the war has caused such a rise in the price of insecticides that it is to be feared that the number of sprayings may be reduced this year. In 1916 the average cost of spraying per acre in our demonstration fields, stations and orchards, was \$11.86 for four sprayings, while the average cost was only \$7 per acre before the war.

In addition to the extremely liberal help which is granted to the members of agricultural associations as an encouragement to spray, the provincial Government also co-operates with the Dominion Department of Agriculture, in order to carry on, in the worst infested districts, an active campaign of destruction against the Apple worm, the Gipsy moth and the Apple scab, these being the greatest enemies of our orchards.

Under this co-operative scheme which has been going on for the last two years, we agree to place at the disposal of the Dominion Entomological Branch a spray-motor, and to supply all the chemical ingredients that are necessary for spraying. On the other hand, the Entomological Branch supplies the services of one of its field officers and presents, at the end of the season, a report on the work done and the results obtained.

The officer in charge of entomological work in the county of Huntingdon last year was Mr. C. E. Petch, who presented the following interesting report on the cost of spraying:

"In the orchards where these experiments were conducted, 10,450 gallons of Bordeaux mixture were used in three different sprayings on 1,970 trees; this is equivalent to one spraying on 5,910 trees or an average of 1.77 gallons of mixture for each tree. The cost of material was \$101.58, and that of the running of spraying machines \$4.93. The average cost for each tree sprayed three times was 10.45 cents. The cost of running the spraying machine during 171 hours was as follows: gasoline \$7, oil \$1.60, making a total of \$8.60 or 5 cents per hour." (Report of 1915 season.)

But to achieve success in this campaign against insect pests, it is not only necessary to generalize the use of insecticides and fungicides known as being the most efficient and to encourage the practice of spraying in infested districts, but also to do survey work in order to localize the infested districts, ascertain the progress of the species that are found therein, note the nature and extent of injuries caused and, lastly, to prevent the invasion of foreign pests.

It may perhaps be said, in answer to this statement, that the best insecticides and fungicides can only be found by painstaking laboratory work. As to this, it may be answered that we cannot, as yet, in the scientific world, hope to cope with French chemists who have astonished the world by their therapeutic discoveries and from whom the investigators of all other nations have borrowed the chemical formulæ, still being

used for the destruction of fungi and insects.

Our opinion therefore is that, as the old formulæ have so far given the best of results, there is no necessity to strive to find new ones.

We shall content ourselves therefore with keeping informed about the latest scientific discoveries, and adopting those that have shown their value in test and that are recommended by expert phytopathologists. Thus, at the instigation of Mr. J. C. Chapais D.S.A., we recently secured from France some "*sapindus powder*" which is much recommended over there and which, it seems, acts both as insecticide and fungicide. It is our intention to make a test application of this powder next spring to see if it is efficient under our conditions.

On the other hand, as the presence of the Gipsy moth and the Brown tail-moth has been recorded within a radius of 15 miles from the boundaries of Montmagny and Bellechasse counties, the Department has requisitioned the services of trained persons who are now doing reconnoitring work under the direction of the provincial entomological inspectors, in order to keep the Department informed on the progress of these insects and to destroy their winter webs if necessary.

As to the diffusion of information on the enemies of plants and the methods of control, there is no doubt that bulletins Nos. 10, 16, 17, 21 and 23, published by the Department and distributed throughout the province, will do a great deal of good in this respect and help in increasing production by teaching the farmers how to fight successfully the insects and diseases which prey upon our cultivated plants.

SCHOOL OF AGRICULTURE OF STE. ANNE DE LA POCATIÈRE

BY REV. FR. J. P. LEVASSEUR, PROFESSOR OF FRUIT CULTURE

THERE is no doubt that the spraying of fruit trees is a very useful work when it is well done.

Two years ago, a serious effort was made here to control the scale insects, Budmoths, Leaf-rollers, Codling moths and Green Aphis. A good deal of work had to be performed on old trees that had never been sprayed and on young trees, nursery stock, and a three-year-old orchard, a total of three acres. The mixtures employed were lime sulphur wash, lead arsenate, kerosine and tobacco decoctions. The lime sulphur wash, prepared at the school (sulphur, 100; lime, 50; water, 50), gave a lactometer reading of only 1210, on account of the poor quality of the sulphur employed.

A single spray, three days after the coming out of the Tent caterpillars gave us the following results: The Tent caterpillars disappeared entirely, although their webs had not been gathered during the winter. Seventy-five per cent of the scale insects were destroyed but the Bud-worms did not seem to be any the worse for the operation. It was therefore necessary to give another spraying. Two more sprayings were given, one two days before the flower buds opened and one after the fall of the petals. After this, only a few Bud-worms and Leaf-rollers cater-

pillars remained. It is hardly necessary to say that the Bud-worms suffered a great deal from the later sprayings. The formulae were: first spraying, lime sulphur wash, 1030, lead arsenate, 2 lb.; second and third sprayings, lead arsenate, 3 lb., soap, 1½ lb., water, 40 gallons.

Ten pounds of tobacco in forty gallons of water settled the fate of the green aphid. The injuries caused by the latter were not very apparent. These remedies were applied in 1915-16 with identical results.

The removal of the rough bark on old apple trees is also beneficial. When the bark is removed, it is easy to reach the enemies that are hidden there.

In the neighbouring counties, the Bud-worms and the Leaf-rollers do considerable damage when no means are taken to check them.

If spraying is not followed by good results, it is, I believe, because the work is poorly done.

In our district, it would be necessary to start a campaign in order to spread information among farmers. To distribute bulletins is not sufficient, practical demonstrations would, it seems to me, be much more efficient. There should be a responsible centre of organization that would teach, demonstrate and even procure the necessary material.

SHALL WE CONTINUE TO SPRAY?

BY REV. FATHER LEOPOLD, OF LA TRAPPE

IT is my personal conviction that there is not perhaps a more important question in the whole line of fruit growing than that of spraying the Fameuse and McIntosh orchard to day. You may neglect

to prune your trees, you may not see any advantages in thinning your fruit or in cultivating the orchard, but if you do not spray you will have scabby and wormy apples to pick.

There is no doubt, let me state it clearly in the beginning, that in the past season there have been quite a few failures. I know of fruit growers in this province who are not satisfied with the results obtained and I shall point out to them that their failure is not due to the fact that spraying is of no value in such seasons as we have had, but rather that they have failed because they have not taken into account one of the many factors which induce success in the enterprise. This I will fully prove later on.

CONTROL OF THE APPLE SCAB

Apple scab is the serious drawback to the growing of the Fameuse and McIntosh in this province. To get a full understanding of the subject, I will begin by a short summary of the important items in the life-history of this disease.

The apple scab disease is caused by a fungus—*Venturia inæqualis*. In the living host, the mycelium may be found in the early stages living on the leaves, confined to a region between the cuticle and the epidermal cells; on the fruit, the epidermal cells are attacked and usually destroyed.

It is well known to-day that *Venturia Inæqualis* or apple scab has two distinct stages in its life cycle. Perithecia are easily located in the spring in old leaves under apple trees following a year of foliage infestation. The perithecia appear most abundantly on the exposed surface of the leaf as it lies on the ground. They appear under a lens as small, domeshaped pimples on the surface of the leaf.

The perfect stage of the fungus begins to develop in fall or early winter, after the scab-infested leaves have fallen.

The ascospores in the perithecia

usually begin to mature at or about the time the blossoms are ready to open. These ascospores do not all mature at one time and the ripening process may continue for about a month. Under continuously wet weather, an uninterrupted discharge of spores can be expected for some time. It is evident that a rainy period sufficiently prolonged to exhaust the leaves of all their ascospores either temporarily or permanently would rarely, if ever, occur, as some leaves would begin to eject spores earlier than others, and this lengthens the period even more.

Experience has taught that when discharge from a given perithecium begins, if kept constantly wet, its entire ascospores are discharged within 24 hours.

WHEN INFECTION OCCURS

From data recorded by Wallace, it seems that the first infection appears between 13 to 15 days after the inoculation by mature ascospores on the leaves. The second period of infection by conidia may be also of the same period of days.

As I have said, this fungus matures its ascospores during a period of wet weather in the spring; but it must be borne in mind that the amount of precipitation is not necessarily the important factor in determining whether or not a certain rain permits infection. A more important factor is the length of time that the trees remain wet so as to allow spore germination.

The ideal condition for infection is a gentle, continued rain, followed by cloudy, calm weather and a saturated atmosphere, in which the spores are kept wet for a long time while in one position (8 or 10 hours or longer). Any condition tending to favour the retention of moisture after rain has ceased tends to favour infection by the fungus. Several

factors may be mentioned in this connection: too close planting of the trees in most of the orchards of the province, as dense foliage prevents rapid drying out of the trees after rain has ceased; good air drainage favours also rapid drying of the foliage, for which reason, orchards situated on hill tops are, in general, less likely to be seriously attacked by scab than are those in sheltered positions where there is poor circulation of air; showers occurring during the day, followed by winds, are not likely to permit infection; showers occurring in the evening, followed by a calm night with a humid atmosphere, are likely to cause abundant infection.

Leaves and buds of the apple are susceptible to infection as soon as they appear and are exposed, but infection does not in fact occur until the ascospores have matured, or until the first appearance of the ascospores.

As stated before, the spores do not reach maturity until the blossoms are either opening or just ready to open. It seems, therefore, that there is little danger of abundant infection earlier than about the time when the pedicels of each blossom clusters are no longer together in a cluster and the blossoms show pink.

The reason for the blossom-bud leaves becoming scabby earlier than others is due to the following fact: the blossom-bud leaves are the very first to open in the spring; they are exposed to the earliest infection, while those from the leaf-buds do not as a general rule appear until 10 days later and thus escape infection. The leaves from fruit-buds are exposed to both the primary (ascospore) infection and the secondary conidial infection, while those from the leaf buds are subject only to the last attack.

SECONDARY CONIDIAL INFECTION

The primary infection due to the winter spores liberated in the peri-

thecia in the spring from the asci, is not severe in itself most of the time; but it is always the cause of the secondary conidial infection, and this one is generally much more abundant, for it in turn causes most of the scabby fruit as well as the most abundant leaf infection noted during the summer.

CONTROL MEASURES

The first important factor in the control of this fungous is what we may call sanitary measures. We must avoid as much as possible the danger of primary infection from the fallen leaves.

The best thing to do would be to plough under these leaves, if possible in the fall, but late enough, when we are sure that all the leaves have fallen. But in our province, I would rather advocate ploughing under the leaves as soon as the horses can get out in the orchard in the spring. The next best thing to do in destroying the fallen leaves would be to protect the trunks of the trees with some manure and burn the fallen leaves with the sod around. Of course this will be a loss in humus for the orchard, but, under the circumstances, I would not hesitate in doing so, as we can get humus more safely otherwise, as ploughing in a crop of buckwheat in the fall.

IMPORTANCE OF PRUNING

The second important factor in the control of scab is pruning. The denser the foliage of the tree, the more slowly it dries out after each rain. The longer the tree remains wet, the better is the opportunity for spores of the fungous to germinate and cause infection. This is all the more true in our closely-planted orchards. Pruning in itself is another factor, if we consider the ease with which we can spray a good pruned tree, compared to the loss of time and spray mixtures in a poorly pruned tree and especially in a tree that has never been pruned. I think it is im-

possible to lodge a spray in all the parts of a tree, especially in the pre-blossom and the post-blossom or calyx sprays, as these two are the most important ones in connection with the control of the apple scab. We cannot insist too much on another item in connection with spraying and that is, economy in time. A good sprayer will cover the ground much quicker in a given orchard if the trees are well pruned.

Both the burning of the fallen leaves or the early ploughing before the spores can be discharged from the asci, and the pruning of the trees, will never dispense with the third important factor in the control of the apple scab. That is thorough spraying made in time.

In view of the above discussion it is evident that the most important method to be employed in controlling this disease is by the timely application of the best fungicide we can find. Both Bordeaux mixture and lime-sulphur wash will do, but on account of the danger of the burning of the leaves and the russetting of the fruit, I would strongly advocate sticking now to the lime-sulphur wash exclusively.

It is now generally admitted that clean fruit cannot be grown unless one sprays his orchard properly. Much is yet to be learned, however, as to the very best methods of spraying.

THE DUST SPRAY

You have no doubt followed with attention the series of experiments made by the professors of Cornell University and others with the new dust sprays.

As perhaps some of you may not know of the conclusions reached after a series of many years of trial, this is the opinion of one of the men who are responsible for the experiments. Writing to me on the subject, Prof. D. Reddick, of Cornell, says:

"In some cases farm bureau agents carried on co-operative experiments with

the farmers and I have had an opportunity to examine all orchards thus treated. In all cases there were direct comparisons with the dusting and spraying. In some orchards the amount of scab was about the same but in others there was more scab on the dusted trees. As usual the dusted trees had fewer wormy apples than the sprayed ones.

"My present idea is that for dusting we should make more frequent applications at least of the fungicide. In such a season as 1916 I should be inclined to make an application every week as long as the rainy weather lasted.

"Dr. Stewart did excellent work and had good results in the control of various foliage diseases occurring upon the foliage of trees in the nursery rows and in view of his results I feel that we do not need to alter our former conclusions very materially."

This letter is dated Nov. 26th. The conclusions which Dr. Reddick refers to may be assumed in the following declaration, which we read in the bulletin of Cornell University, No. 369, entitled "Dusting and Spraying Experiments with Apples," edited by Dr. Reddick and C. R. Crosby:

"It now seems settled that a mixture of an insecticide and a fungicide can be applied in powdered form, using air as a carrier, with better commercial results in the control of preventable apple diseases and of apple insects than can be obtained by spraying. At the same time, the dust method makes it possible for the owner of a large acreage to protect his orchard at critical times, a thing that he has not been able to do with the slow liquid process.

"It appears from the experiments that good results can be obtained if a mixture of 85 per cent of exceedingly finely ground sulphur and 15 per cent of powdered arsenate of lead is put on the trees at the proper times in amounts of 1.25 to 2.5 pounds per tree each application.

"Trees must be treated from two sides, either by driving twice in each row, or in the case of trees with fillers set on the quineun system, by swinging the outlet pipe alternately from one side of the machine to the other. The most satisfactory method of handling the outlet pipe is a steady up and down movement or sweep of the outlet. Do not overlook the branches that are nearest the machine. Be thorough in the work of applying the dust. Many persons may infer that the dust may be easily applied by driving once in a row, but this is not the case if one wants to be thorough.

"The time of-application does not differ from the time of application of the liquid sprays. It is possible to make, however, applications of dust at unusual times in order to meet special conditions. More frequent applications in fact, using smaller quantities of material each time may give greater satisfaction.

"The time of day when the dust is applied is of little consequence. There is no special advantage in applying dust when the dew is on the foliage, except for the fact that the presence of dew is a good indication of a calm atmosphere. Under such condition dust can be applied just as fast as a team can be driven through the orchard.

"There have been many inquiries as to what it is that makes the dust preparations adhere to the foliage. There seems to be two factors involved. During the early period of growth of the leaf and the fruit a dense mat of fine plant hairs covers each. The particles of the dust mixture are fine enough to lodge between these hairs, and are there protected from wind and rain. It appears therefore that the fineness of the material employed is an important item. The same hairs of course are effective in holding many spores of the fungus in place until they have had time to germinate

"The other factor of importance is the adhesive nature of the arsenate of lead when moistened, which then becomes somewhat gelatinous, and is difficult to wash away completely. The moisture is supplied by the dew of the succeeding night or gentle rains.

"In regular work, there is little danger of breathing the dust, except perhaps in turning at the end of the rows when there is some wind and in filling the hopper of the machine. At any rate no inconvenience has been experienced by any one. It is advised to use a good pair of goggles in doing the work, the driver having a pair also.

"Aside from the mounted dusting machine and engine, no special equipment is needed, with the exception of the goggles. A very small quantity of sulphur dust in the eyes causes an irritation which becomes noticeable only an hour or more after, and which is aggravated by rubbing. A pair of goggles that fit tightly about the eyes and cover the least possible extent of surface is desirable. The larger kinds are likely to become fogged from perspiration."

These conclusions on dust spraying in the States have somewhat been corroborated by what I heard personally from Prof. Caesar of Guelph, while attending, in November last, the annual meeting of the Ontario Entomological So-

ciety. Mr. Caesar's experience in the past season was somewhat encouraging as he obtained good results especially in the spraying of old large trees and doing the work quicker than with the liquid sprays.

Prof. P. J. Parrott, of the New York Experimental Station at Geneva, in writing recently to me makes the following statement in regards to dust spraying:

"Some time ago I attended a conference of agricultural workers of Cornell and at that time no new data was offered regarding the nature of dust sprays for our commercial apple orchards. As a matter of fact the feeling prevailed that sulphur dust did not meet the claims made for it last season and it was recommended that lecturers of farmers institutes advise fruit growers to use the lime sulphur solution according to the approved spraying schedule."

Therefore, after this concrete resumé of what we can do in dust-spraying, let us come to the main discussion of the best means of control we have for the apples affected with scab generally.

WHEN SHOULD WE SPRAY?

We know from the brief life-history of the disease herewith given, that this question is the main thing in the whole question of spraying. For to know when to spray is to know when infection occurs in order to prevent it. The first infection usually occurs when the blossoms are about to open, or as soon thereafter as favourable weather conditions arise. Spraying for scab must be begun before this time if the trees are to be insured against early infection. Since the ascospores do not mature until about the time when the blossoms show pink, and this condition is when the blossom buds are separated from each other in the one cluster, but before the blossoms open, the first application may be delayed until about that time. In experiments conducted at Cornell, although the weather from the time the leaf buds first opened was such as to furnish ideal conditions for

fungous infection, the spray applied after the buds were showing considerable pink prevented the early infection.

First.—We must not forget that the primary infection is often very light, but last season, it was much greater than usual in most of our orchards. An abundance of dead leaves lying open under the trees, and, a development of an abundance of perithecia in these leaves, furnished the source of infection, and the wet weather we had in the early part of May, 1916, coming at the right time, that is after the rains of

ably and new surfaces will have been exposed. Last year I am satisfied that a fourth application made before the heavy rains of August the 9th, preceded, and followed with a total period of wet weather of 6 days, would have given a practically clean crop of Fameuse and McIntosh.

Third.—Not only should the fruit grower watch the condition of the fruit buds, but he should also watch the weather and attempt to get the spray on ahead of a general storm period. Many growers delay the spraying until the rain is over, if rain weather happens to be threatening



APPLE TWIGS SHOWING STAGES OF BUD DEVELOPMENT

Twigs 2, 3 and 4, from left, show proper stages of development for spraying for apple scab.

May 1st, 2nd and 3rd, with a trace on the three following days with two more additional days of rain on the 7th and 8th, gave us but one single sunshine day—the 9th of May, and the wet weather furnished the ideal condition for the first infection of scab that spring.

Second.—An application after the blossoms fall is necessary in order to protect the trees from later attacks, and it is also advisable under ordinary attacks, to spray again two or three weeks later. By this time the apple will have grown consider-

at the time, thinking that the rain will wash off the spray. No worse mistake than this can be made. It is during the wet weather that the spray is needed to protect the trees from infection, which occurs only in the presence of excessive moisture. The spray does not wash off so easily as it is supposed. If a lime-sulphur and arsenate of lead spray has twenty-five minutes to dry on the trees before any washing rain occurs, it will adhere well.

Fourth.—There appears to be an opinion that the dormant spray that

is applied before the leaf buds are out, and as large as a ten-cent piece, is important and necessary in the control of the apple scab.

The life-history of the fungous in relation to this point shows evidently that the main point, or source rather, of infection is the dead leaves. Spraying the leaves before the leaves open cannot be expected to give protection from this source of infection, because the leaves and young blossom clusters which are to be protected are not yet exposed so that the spray can reach them.

It has been thought that the conidia can live over winter on the twigs, or the bud scales, and that the spray applied during the dormant period kills them. It is true rather that the conidia are not likely to live through the winter on the twigs of the apple trees, as may be the case for pear scab, which we sometimes find on twigs.

Even though it be admitted that some infection may occur from either source, it would not change the facts from the practical standpoint. It is known certainly that ascospores are responsible for at least most of the early spring infection, and that it is necessary to spray in order to protect trees from this source. It is further known that it is impossible to protect trees from this source except by coating the surface of the parts to be protected with the spray, and this cannot be done until those parts are exposed.

It should, however, be perfectly understood that good results may be obtained for many seasons or under certain conditions when the application before the opening of the blossoms is omitted. In many cases a single spraying after the blossoms have fallen gives excellent results. But this was not the case last season, as I shall soon point out to you conclusively. But the point to be emphasized here is that in cases in which the early summer spraying is important, the dormant spray cannot be substituted for it.

Fifth.—Here is another point on which I wish to call your attention, and, if suggestive, may point to the important factor which I personally believe was the reason of the failure of a clean crop in one of our demonstration orchards this year. It is of the utmost importance to make each application at the proper time and of being prepared to do so.

NECESSITY OF SIMULTANEOUS SPRAYING

Any grower having fifty to one hundred acres of mature apple orchard, who expects to do all his spraying with a single outfit, will find it absolutely impossible to comply with the above requirements, since, as can be seen, the time limit for the most effective application last season at least, did not exceed four or five days. When we consider that during the whole month of May, 1916, there were only 10 days in which there was no precipitation of rain, and that the total precipitation for the month was 4.98 inches, giving us a rainy period the first to the 20th of May of 16 days and only four days of sunshine, we can readily understand that one single sprayer could not do the work of so many orchards as were sprayed in St-Joseph du Lac. Naturally some orchards was sprayed in time, but nine chances out of ten chances the others were not.

If we can grow apples to perfection such as the Fameuse and McIntosh in this province, well we must absolutely provide sufficient spraying equipment to thoroughly spray the entire orchard within four or five days at the most.

I shall insist somewhat more on this point and emphasize the necessity of replying in the affirmative to the following question, which is of daily occurrence on a large farm in the spring:

Shall the sprayer be run on a certain day in preference to doing other farm work? Yes; for this is the one

point upon which effective disease control hinges. First of all the trees must be in condition for an effective application. Aside from that the determining point should be based on a prognostication of the next storm period. Any one can learn to make intelligent use of the weather bureau, and by going back to the twenty-four hour forecast and examining the maps from which the forecasts were made one can determine in a general way what may happen in the next two or three days. If there are probabilities of a general storm period within forty-eight hours, the orchard should be protected regardless of other farm operations. The oats will grow if put in after the rain but orchard treatments after the rain will not prevent infection.

The inter-relation of bud development with the development of the scab fungus, and the relations of these to meteorological conditions—particularly the occurrence of rain-fall—should never be in the doubts of the minds of fruit growers.

SUMMARY OF CONCLUSIONS

1. Good pruning is recommended for the control of the apple scab as it affords ease and economy in spraying and better air drainage will favour the rapid drying of the foliage.

2. Keep in mind that all possible primary infection comes from the dead fallen leaves—therefore destroy them as much as possible.

3. Afterwards spray the trees, following the rules here summarized. The dormant spray will not control the apple scab. If we had the San José scale here in the province, we could afford to maintain this spray. At all events, if one wishes to put it on, then retard it until the leaves of the more advanced apple buds are projecting from one-fourth to one-half inch. To every one hundred gallons of the fungicide spray add three-fourths of a pint of nicotine

solution. We must bear in mind that, to successfully destroy the aphids, they must be killed before they obtain protection in the fuzzy, unfolding buds or leaves.

4. Put on the first scab spray for the direct control by prevention of the disease, when the blossom buds are separated in the clusters and show pink. Use lime sulphur wash, 1.008 strength.

5. Immediately after the petals of the flowers fall put on the same strength of lime sulphur and add to this 2 lb. of neutral arsenate of lead, or 1 lb. of the dry arsenate of lead in powder form. Mix the lead well with a little water before adding to the tank. This is the calyx spray, and, though important for the prevention of scab, is the best time to spray for the Codling moth. Try patiently to get the spray in every calyx on the trees and you will get a good percentage of apples free from the worms.

6. Three weeks later put on the second Codling moth spray and the third scab spray, using the same quantities and the same strength as in the preceding spray. This will control part of the Codling moth side injury to the apples, besides helping to prevent infection of the scab, especially in a spring like we had last year.

Those are the regular sprays I would recommend. Now much could be said here on the manner to spray. I will insist only on two points:

- (1) Be prepared to spray.
- (2) Be thorough in spraying.

PROOFS OF SPRAYING VALUES

The crop of Fameuse and McIntosh at Macdonald College was perfectly clean last year as ever, because the pre-blossom spray when the clusters were showing pink was safely put on before the primary infection period, as the orchard was sprayed from May 15th to the 22nd in except which was a Sunday, the calyx

spray being put on the trees around June 6th. Notwithstanding the fact that the young orchard here was not given another spray, which I would have thought advisable in such a season as the one we had, the fruit as I said was practically all clean.

Another instance worth recording here is the case of one of our good directors, and a successful fruit grower, Mr. G. B. Edwards, of Covey-Hill. Mr. Edwards has 20 acres of apples of the Fameuse variety and he wrote me that he had only 40 barrels of spotted Fameuse and 1650 barrels of No. 1 Fameuse. Now I am satisfied

that this is a great success, and one due to spraying well and in time. For he succeeded with the three sprays which I am advocating here to-day: the first was put on the trees May 15th, and this spray was precisely when the blossoms showed pink; the second spray was on the 6th and 7th June, after the blossoms fell and the last three weeks later, June the 21st. Mr. Edwards adds that the forty barrels came from the same trees which were overlooked and were not sprayed thoroughly. His neighbours who did not spray had very scabby apples, most of which graded No. 3.

ONTARIO

BY W. F. KYDD, FRUIT BRANCH, DEPARTMENT OF AGRICULTURE

THE Ontario Department of Agriculture carries on special experimental work on a commercial scale in five full bearing orchards leased for the purpose for long terms. In all of these experimental orchards about half of each are in sod mulch. Some of the trees are in sod strips, varying in width from 7 to 10 feet. Some of the trees are in squares of sod, varying in size from 10 to 15 feet. This latter method permits cultivation both ways. Next season some of those squares will be cut down to 6 feet. The last two seasons there has been very little, if any, difference from the different methods of cultivation. In a more normal season we would expect better coloured fruit where there is no cultivation. We feel sure there should be cultivation in the early part of the season on light land to get size in fruit. Part of each orchard was ploughed in the autumn. This does not apparently make any difference to size or colour, but there is no doubt it makes a great difference to the expense of spring and early summer cultivation. When the land was fall ploughed half the cultiva-

tion kept the orchard clean and in good condition for conserving moisture.

As a result of the recommendation of dust instead of liquid spray in New York State, dusting experiments were carried out in four of the orchards. Only one machine was available and this had to be expressed from place to place, causing loss of valuable time and the absence of the machine from the orchards at critical periods in scab control. The foliage was noticeably cleaner and healthier on the dusted trees, resembling that on trees treated with the Bordeaux mixture, but the fruit itself was not in the same class as that sprayed with the commercial lime sulphur. Taking into account the above conditions, and the abnormal season, together with the experience gained in handling the machine, the Department feels fully justified in continuing this work during 1917.

To show that these methods are producing results, 6,500 boxes of fine fruit were packed and shipped from these five orchards in 1916 to the hospitals in England and France.

PARIS

This orchard is leased from G. A. Parkhill and is about 2 miles from Paris. This might be called an inland orchard, about thirty miles from the nearest body of water. The greater part of the orchard is on slightly elevated ground, sloping to the west. The lowest part is approximately fifteen feet lower than the highest part. There is a thick, high windbreak of Spruce trees on the west side. As will be shown later, this windbreak and depression make a great difference in control of fun-

gous. There are in this orchard 200 Spy trees, some Wageners, Greenings and Baldwins. Those are nearly all very large trees. The sprays were the usual recommended strength:

- First.*—Dormant spray.
Second.—Bud Moth spray.
Third.—After blossoms had fallen.
Fourth.—June 19th.
Fifth.—August 3rd.

As a result of this work, the following percentages of good fruit were obtained in a year that had been almost without parallel in conditions favourable to scab:

Wageners.....	5	Sprays	100	per cent	clean	from	fungous
Greenings.....	5		97	"	"	"	"
Spys.....	5	"	96	"	"	"	"
Spys.....	4	"	95	"	"	"	"
Spys.....	3	"	89	"	"	"	"

WHITBY

Orchard leased from J. J. Fothergill, one and a half miles from Whitby, on Kingston road. The orchard is in two parts with home and lawn between, the one part is surrounded with high spruce trees, consequently there is very little circulation of air. The other part has a dense windbreak on west side. Owing to the sheltered conditions, scab is hard to control. Following are the results obtained:

	Sprays	Clean
Ribston Pippins. . . .	5	96 per cent
Greenings.....	5	90 "
Snows.	5	84 "
Spys.	5	80 "

THEDFORD

Orchard is leased from Wm. Hawkins. Previous to the Department taking over this orchard, it had not made the owner much profit. It had a very neglected appearance; trees had not been pruned for years; land is naturally poor. It needed the

three necessities, pruning, spraying and manure. Last season our heaviest crop was in this orchard, in which the best trees are nearly all Spys. All of the orchard had 5 sprays. In different locations of this orchard, a great difference was found in being able to control scab, as the table herewith indicates:

Spys --1st location.	5	Sprays	97	%	clean.
Spys--2nd "	5	"	85	"	"
Spys--3rd "	5	"	77	"	"
Holland Pippins .	5	"	90	"	"

COLLINGWOOD

Orchard is leased from D. McArthur, and is about two miles from Collingwood, so is that distance from the lake. Half of the orchard contains young trees, which have only been bearing a few years. Last season scab was easier to control in this orchard than in the others, with the exception of McIntosh Reds. As will be seen 3 sprays in this district last year were about equal to 5 in some of our other orchards.

	Sprays	Clean per cent
Snows... ..	3	95
Snows... ..	4	96
Snows... ..	5	96
Greenings... ..	3	98
Greenings... ..	4	98
Greenings... ..	5	98
Spys... ..	3	96
Spys... ..	4	96
Spys... ..	5	96
McIntosh Reds... ..	6	90

The fruit in this orchard was very good.

WELLINGTON

The orchard is leased from H. B. Collins & Son, and is part of a larger orchard on the farm. There are about 200 large Spy trees quite close to Lake Ontario, and 50 smaller trees, Ben Davis and Cranberry Pippin, half a mile far-

ther away from the lake. The older trees were selected because of the presence of blackrot canker in all parts, causing an unthrifty condition. This disease is very prevalent in Eastern Ontario and the idea was to attempt putting new heads on the old trees. Like the other orchards part of this one is in sod mulch. We are convinced this soil is not suitable for that method; should have cultivation early in the season. Owing to its proximity to the lake, this orchard is also more subject to attacks of scab fungus than any of the others.

In part of the orchard the dormant spray was omitted. When that was left out there was 16 per cent more scab.

Spys... ..	3	Sprays	No Dormant Spray	52	per cent clean
Spys... ..	4	"	including "	68	" "
Spys... ..	5	"	" "	83	" "

In orchard $\frac{1}{2}$ mile further from lake:—

Cranberrys... ..	4	Sprays	89	per cent clean
Ben Davis... ..	4	"	92	" "

BRITISH COLUMBIA

BY R. M. WINSLOW, B.S.A., PROVINCIAL HORTICULTURIST AND INSPECTOR OF FRUIT PESTS

UNTIL recent years, the fruit growers of British Columbia have not done very much spraying. As a rule it has not been necessary. Various circumstances have combined to make a great change imperative, though, even at the present time, the amount of spraying done is relatively much less than in most fruit districts. Three of the past four seasons have been marked by unusually wet or cool spring weather, which fostered fungous diseases, such as apple scab and mildew, peach mildew, peach leaf curl, etc. There has also been some increase in the amount

of bud-moth and peach twig borer. The peach thrips has made a great difference on Vancouver Island. The great expansion of the industry has naturally created a more favourable field for all kinds of pests.

The growers have been prompt to recognize that conditions are changing. There was a great increase of spraying in 1915. The increase in 1916 over 1915 is also marked. The various district officials of the Horticultural Branch have reported on the number of power sprayers and increase in amount of spraying done. Their reports are tabulated as follows:

DISTRICT	Number of Power Sprayers	Per Cent Increase Sprayers	Per Cent Increase of Spraying Over 1915
Vancouver Island.....	5	20 per cent	35 per cent
Vancouver to Kamloops..	3	none	none
Upper Okanagan.....	50	35 per cent	25 per cent
Lower Okanagan..	38	25 per cent	50 per cent
Grand Forks.....	4	50 per cent	25 per cent
Kootenay.....	10	25 per cent	40 per cent
Total and average.....	110	30 per cent	35 per cent

The increases are remarkable. They are not spasmodic in character, for nearly all of the present day spraying is being well directed, and is showing fair to excellent returns for time and money spent.

EXPERIMENTAL SPRAYING

The Horticultural Branch was last year able to do a greatly increased amount of spraying, by reason of the consolidation of the horticultural and pest inspection services last April. The more important results are mentioned briefly:

Pear Thrips Control on Vancouver Island: This work has proven that the nicotine sulphate and whale oil soap spray will control pear thrip. The results were published in THE AGRICULTURAL GAZETTE, Vol. 3, No. 11, November, 1916, by Mr. R. C. Treherne, the work being done in co-operation with the Dominion Entomological Staff.

Apple Scab: A series of three-year

tests was started using typical orchards at Vernon, Kelowna, Salmon Arm, Nelson and Creston.

Aphis Sprays: A further test last year again showed that Black Leaf 40, at $\frac{3}{8}$ lb. lime, at 2 lb. to 100 gals. of water, gave results equal to any other of the commonly used sprays, and practically 100 per cent results. The cost of this spray is very low, even under unfavourable conditions, costing only 60c. per 100 gallons. It will be noted that the dilution of Black Leaf 40 is only half as strong as that ordinarily recommended and used.

Apple Mildew: Experiments at Kelowna indicated that the best time to control apple mildew is early in the season, using aromic sulphur for the semi-dormant and pink sprays.

Apple Tree Anthracnose: Experiments in the control of this disease, which is serious in the coast districts, were started in September. The results will not be known until spring.

CONTROLLING APPLE SCAB IN BRITISH COLUMBIA

BY R. M. WINSLOW, B.S.A., PROVINCIAL HORTICULTURIST AND INSPECTOR OF FRUIT PESTS

IN many parts of British Columbia scab is the worst pest the apple grower has to combat. In 1915 and even in 1916, it caused more loss in the aggregate than all other apple diseases or insects. A rigid system of inspection has kept many pests out of British Columbia altogether,

and others which have penetrated the first line of defence are being fought at every point of infestation by the Provincial Department of Agriculture and the growers in co-operation. Apple scab, like most fungous diseases is not in its nature susceptible to control methods such

as have barred out the San José scale and Gypsy moth; nor, once it gets into any district, can it be delimited and controlled as is being done with Codling moth.

Even to the present day, there are orchard sections, new and somewhat apart from other orchard areas, in which apple scab would thrive, but is not yet to be found. Only five years ago, the West Kootenay had very little scab; but its rapid spread, especially in the last three years, has caused much alarm, and has discouraged even the most careful and conscientious growers. The Okanagan Valley is a different case. Only an occasional speck of scab has ever been found in the southern end. In 1915, however, the Kelowna district had a wet summer and a lot of scab. Normally, the Vernon area has been practically, but not entirely, free of scab. A year ago it was very bad, owing to wet, and rather serious on McIntosh Red last season. The Salmon Arm and Armstrong sections normally have a moderate amount of scab.

In view of the losses of 1915, the Horticultural Branch carried on an extensive series of tests during the last season. The consolidation of the

Horticultural and Pest Inspection Branches, recently effected, made possible an adequate staff and equipment for the purpose. One standard set of tests was devised by the horticultural staff in conjunction with Mr. J. W. Eastham, Plant Pathologist. The experiment is to be carried on for three years, using the same plots in the same orchards, in five different districts. Mr. P.E. French, Asst. Hort., Vernon, conducted the experiments at Vernon and Salmon Arm; Mr. B. Hoy, Asst. Hort., Kelowna, that at Kelowna, and Mr. M. S. Middleton, Asst. Hort., Nelson, those at Nelson and Creston. Mr. J. W. Eastham, gave the experiments his general supervision by a series of visits throughout the season.

LOCALITY TEST

The object of the "locality" test was to determine the best and most economical application or combination of applications of lime sulphur, applied at the generally recommended strength, in each of the five districts. There were seven plots in each orchard. One (No. 7) was the check plot. The others all had lime sulphur, as shown in this table:

SPRAY	Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 6	Plot 7
Delayed Dormant...	LS 1-25	LS 1-25	.....	.....	.....	.....	.....
Pink.....	LS 1-30	.....	LS 1-30	LS 1-30	LS 1-30	LS 1-30	.....
Calyx.....	LS 1-35	LS 1-35	LS 1-35	LS 1-35	LS 1-35	LS 1-35	Check
10-14 days later.....	LS 1-35	LS 1-35	LS 1-35	LS 1-35	.....	.....	.....
10-14 days later....	LS 1-35	LS 1-35	LS 1-35	.....	.....	LS 1-35	Plot

NOTES

Arsenate of lead, two lb. to 40 gals. added to calyx spray in every case, but none applied on check plot.

"LS" is lime sulphur, 32° Beaume. "Delayed-Dormant" was applied when the leaves were about $\frac{1}{4}$ " to $\frac{1}{2}$ " long.

"Pink," applied as the blossom buds were showing pink, a few of them getting pretty well open.

"Calyx," applied as the blossoms were falling.

"10-14 days later," applied about that

time after the calyx spray; apparently the applications do not need to be so close together as in Ontario, due to cooler weather. The last spray ran about two weeks after the fourth, but in one case more.

SALMON ARM

Variety, McIntosh Red, 10 years old.

Weather dry in June and wet in July, otherwise normal. The check plot was very bad with scab, less than 1 per cent of clean fruit; 24.1 per cent of the apples were scabby, but marketable, and 75.1 per cent of the crop was quite unmarketable.

In the sprayed plots, results were excellent. Plot No. 1 (five sprays), gave 99.8 per cent clean fruit, and 100 per cent marketable.

Plot 2, (4 sprays omitting the pink), gave 97.5 per cent clean, and 98.5 per cent marketable.

Plot 3 (4 sprays omitting delayed dormant), gave 95.8 per cent clean and 99.3 per cent marketable.

Plot 4 (3 sprays, omitting delayed dormant and last spray), fell down to 79.7 per cent clean though 99.8 per cent was marketable.

Plot 5 (2 sprays, pink and calyx only), was badly scabbed with only 27.8 per cent

of clean fruit, and only 83.9 per cent marketable.

Plot 6, showed the most economical results, for with 3 sprays (pink, calyx and the late spray), it gave 97.8 per cent of absolutely clean fruit, and 99.9 per cent marketable. Had the weather been normal, damp in June, and dry in July, it is likely that Plot 4 would have given the best results.

VERNON

Variety, McIntosh Red, 12 years old.

This district is drier than Salmon Arm, and normally scab is not serious. The results were as follows:—

	Per Cent Clean of Scab	Per Cent Marketable	Per Cent Culls
Plot 1. All 5 sprays.	99.77	100	no culls
Plot 2. Four sprays, no pink	100	100	no culls
Plot 3. Four sprays, no delayed dormant	99.32	99.74	0.26
Plot 4. Three sprays, no delayed dormant or last spray.	98.88	99.68	0.32
Plot 5. Two sprays, pink and calyx	94.16	96.02	3.98
Plot 6. Three sprays, pink and calyx and last spray	98.06	99.69	0.31
Plot 7. Unsprayed.	50	70	30.0

At Vernon, therefore, there were no commensurate results from more than three sprays. A comparison of plots 4 and 6 with No. 5 show that the third spray in each case gave a gain of 4 per cent of clean fruit, which, however, was only about enough to pay the cost. As a matter of insurance, one spray, following the pink and calyx, would be advisable.

KELOWNA

There was no scab last year and all plots showed 100 per cent clean fruit. In this case the cost of spraying was lost, except as for insurance.

Kelowna is an example of a district which is not quite dry enough to keep out scab altogether, so that in the unduly wet seasons the grower may be caught unprepared.

NELSON

Mixed varieties, but some McIntosh Red in each plot. These trees had been badly affected by scab in previous years, were close together, and were rather low in vitality and yield. The climate is normally favourable to scab, with 4 to 6 inches of

rain in June, and last season was especially wet. Plot 1 (5 sprays), was 82 per cent clean; Plot 2 (4 sprays, pink omitted) was 13 per cent clean; Plot 3 (delayed-dormant omitted), was 84 per cent clean; Plot 4 (delayed-dormant and last spray omitted), was 83 per cent clean; Plot 5 (pink and calyx only), 17 per cent clean; Plot 6 (pink, calyx and last spray), 7 per cent clean. Check plot 100 per cent scabby.

It is noticeable that the results, even of five sprays, are not perfect; but bad weather, a hand pump, and the orchard conditions account for this. It is seen that the essential sprays were the pink, calyx and 10-14 days-after calyx, as in Plot 4, and that each of these was well worth while, but that additional sprays did not pay.

Percentage of scabby fruit is not everything. How about the yield? The McIntosh Red trees in the three cleanest plots at Nelson averaged 53 lb. each; on plot 7, the check, about 10 lb. per tree.

The apples on the well sprayed plots, even when scabby, were large,

well-formed and marketable; on the other plots, especially the check, they were deformed, knotty, and heavily scabbed.

There was also a difference in the size of the apples on the plots. The average weight of the clean apples was $8\frac{1}{2}$ per cent greater than that of scabby apples.

The Nelson experiment was especially striking because of the poor results being obtained under commercial conditions. As one grower put it, "If I have scab I know now it is my own fault."

CRESTON

McIntosh Red, trees 10-12 years old.

The general conditions as to climate are similar to Nelson, but, on the whole, rather dryer. The orchard used was more favourable to work in—trees not so dense, easier to get around, and in reasonably good health; and a power outfit was used. Consequently, the results were more nearly perfect than at Nelson. The various plots showed results as follows:—

Plot 1. 97 per cent clean.

" 2. 92	" "
" 3. 95	" "
" 4. 93	" "
" 5. 80	" "
" 6. 70	" "
Check, 0	" " (all scabby).

In every case, every apple showing even one "pin-head" scab spot was counted as scabby. In all the plots, the amount and intensity of scab and scab-injury on each apple varied with the percentage of apples affected. On the whole, the most economical results were those obtained on Plot 4, which coincides with the results at Nelson.

INJURY TO LEAVES

At Nelson and Creston, a number of leaf counts were made to determine the amount of scab on the foliage. The results at Nelson showed very much as with the fruit 89 per cent of the leaves on the

check plot scabby, and only 31 per cent on the best sprayed plot.

At Creston 50 per cent of the leaves on the check were scabby and only 4 per cent on plots 1 and 2. Undoubtedly, the difference in vitality of the foliage indicated by these figures, will show in increased bloom and yields this season.

SOME CONCLUSIONS

1. The season's results do not show any particular efficiency for the delayed-dormant spray for scab.

2. The pink, calyx and 14-days-after calyx are the three sprays of greatest general utility. These are the sprays most generally recommended, and the results seem to show that in the humid interior of British Columbia they are all valuable.

3. The Salmon Arm experiment shows that a wet July makes a summer spray advisable. It may be stated that the Salmon Arm experiments of 1914 and 1915 show results in favour of the three sprays, pink, calyx and 10-14 days-after calyx.

4. The Kelowna experiment is mainly of value in recording that in the dry belt districts an abnormally bad scab-year may be followed by one of perfectly clean fruit.

5. The sprays increased, not only:—

- (1) The percentage of fruit absolutely free from scab;
- (2) The percentage of marketable, though slightly scabbed fruit.
- (3) The average weight of the individual apples;
- (4) The yield;
- (5) The set of fruit; and
- (6) The vigour of the foliage.

6. The dormant and the pink, especially the latter, have a great effect on the setting of the fruit. Scab, and almost scab alone, was the cause of a short crop in West Kootenay this year.

MATERIAL TEST

At Salmon Arm, Mr. French tried out lime sulphur (LS), atomic sulphur (AS) and Bordeaux mixture, (BM) on 10-year-old McIntosh apples. Five plots and a check were used. All sprayed plots had three sprays—pink, calyx, and 3-4 weeks after the calyx.

TABLE SHOWING RESULTS OF MATERIAL TEST

Plot	Pink	Calyx	3-4 weeks later	Per Cent Free from Scab	Per Cent Marketable
1	LS 1-30;	LS 1-35;	LS 1-35.....	90	99
2	AS 6-40;	AS 6-40;	AS 6-40.....	75.93	97.87
3	LS 1-30;	AS 6-40;	AS 5-40.....	81.08	99.57
4	LS 1-30;	LS 1-35;	AS 5-40.....	92.06	99.38
5	BM 4-4-40;	BM 4-4-40;	BM 4-4-40.....	83.1	97.3
6	Check unsprayed.....			.8	24.9

Plot 5, Bordeaux mixture, had 39.64 per cent of fruit russeted by burning, so that this percentage was No. 2 and No. 3 apples. The atomic sulphur did not give results equal to lime sulphur; replacing two lime sulphur sprays with atomic sulphur, increased the percentage of scab materially. Previous experi-

ments showed soluble sulphur also to be less efficient than lime sulphur.

The experiments all tend to show that a very good control of scab can be had with lime sulphur, even where the unsprayed trees show 98 per cent to 110 per cent scabby fruit.

There are numerous instances in the province where it is not practicable to establish a school-garden in or convenient to the school-grounds, on account of lack of available space or because of impossible soil conditions. In such cases a home-gardening scheme should be carried out, or a combination of home and school gardening. As home-gardening makes somewhat larger demands upon the individual pupil than does school-gardening, it is preferable that it be carried on with pupils in the second, third and fourth reader classes only, and that the smaller children have a small neatly arranged garden at the school, where they can be under the constant supervision of the teacher. This school-plot for the primary classes should not contain more than 50 square feet per child with the necessary walks or paths. This small garden for primary classes has an additional advantage in that it also serves the purpose of a demonstration garden for the pupils who have home-gardens. The teacher, by means of this small demonstration garden, will be able to give instruction to the pupils operating home gardens in a much more practical and effective way.—J. W. Gibson, M.A., *Director of Elementary Agricultural Education, British Columbia.*

NOVA SCOTIA

DISTRICT REPRESENTATIVE WORK

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

ONE of the most important developments of the agricultural policy which the federal grant for the aid of agriculture in Nova Scotia has enabled the Provincial Department of Agriculture to establish, is that of placing agricultural leaders in the various counties of the province. It is hoped ultimately to bring all the counties under this scheme, but this will take time. In the Cape Breton counties and in Antigonish and Guysboro, there have been placed six men, sometimes added to by assistants whose work it has been to go right out in the fields of the farmers and by example as well as precept encourage improved methods of agriculture. The effort in Cape Breton has been specially directed towards encouraging farmers to keep more and better cattle and sheep and other live stock. To this end special attention has been given to the extension of acreage of turnips grown as food for the animals. This crop has been made the basis for tests with various commercial fertilizers, seaweed, fish refuse, and manure. The farmers have been taught that in succeeding years, the turnip land must be systematically rotated, which is one of the great requisites in economically growing crops of all kinds. By the application of lime in the fall of the year to land to be devoted to turnips the following season, that exacting scourge of the turnip, "club root", has been almost completely conquered.

Creameries have been established

at a number of points and the farmers have been induced to secure the benefits of these by improving their cow stock and by caring for them in the most advanced way. Attention has also been given to drainage, the cultivation of difficult fields and to many other phases of farm economy. As far down as Ingonish a school fair was held at which some 350 exhibits of garden and farm products were made by the pupils.

In Antigonish county the representative is interesting farmers in the best use of fertilizers and in the marketing of their produce co-operatively. The same class of work is going on in Guysboro county. Demonstrations have been carried out in sheep dipping, potato spraying, and improved methods of growing all kinds of crops. Co-operative marketing has also been encouraged here as well as competitions in gardening among the pupils attending the rural schools in the county. The County Farmers' Association has been organized. At one central point a modern grain fanning mill has been set up and the farmers instructed in its use in the preparation of seed grain.

The idea of THE AGRICULTURAL INSTRUCTION ACT, involving as it does the principle of bringing the gospel of improved agriculture right to the doors of the farmer, is right. If the federal grant was thus far responsible for nothing more than introducing this county agent system into the province of Nova Scotia, it would have been well spent.

QUEBEC

MACDONALD COLLEGE

SUBURBAN GARDENING SHORT COURSE

MACDONALD College carried out a successful short course in suburban gardening in the city of Montreal. The course occupied the evenings of the four days ending February 1st. The series was designed to help, more particularly, beginners in gardening to make profitable use of their backyards and vacant lots in the growing of vegetables and flowers. The course took up the soil, its preparation, planting and cultivation, spraying,

the care of lawns and house plants and the establishing and handling of perennial borders. Three hundred and sixty applications were received for the course and more than three hundred were present at each of the four evenings. The series was in charge of Mr. T. G. Bunting, Professor of Horticulture, who was assisted by other representatives of the teaching staff of Macdonald College.

ONTARIO

INCREASED PRODUCTION OF VEGETABLES

THE Ontario Department of Agriculture is making a special effort to encourage an increased production of vegetable crops. Mr. S. C. Johnston, the vegetable specialist, has concluded a series of conferences held in all of the cities and many of the larger towns throughout the province. These conferences consisted of afternoon and evening sessions, at which experienced growers delivered addresses on vegetable growing with special reference to such important crops as onions, celery, and green house crops. Mr. Johnston illustrated the

growing of these crops in moving pictures taken on the farms and in the green houses of successful Ontario growers. The conferences have created much interest wherever they have been held. These meetings are being followed by an educational campaign in the form of newspaper articles and advertising and the distribution of bulletins on vegetable culture. This work comes within the extension activities of the Department under the provisions of THE AGRICULTURAL INSTRUCTION ACT.

VINELAND HORTICULTURAL EXPERIMENT STATION

NEW VARIETIES OF VEGETABLES

THE vegetable work at the Vineland Experimental Station is so new that no list of new productions evolved at this station

can be provided. Progress has, however, been made in producing an improved variety of cucumbers. Having this in view some work has

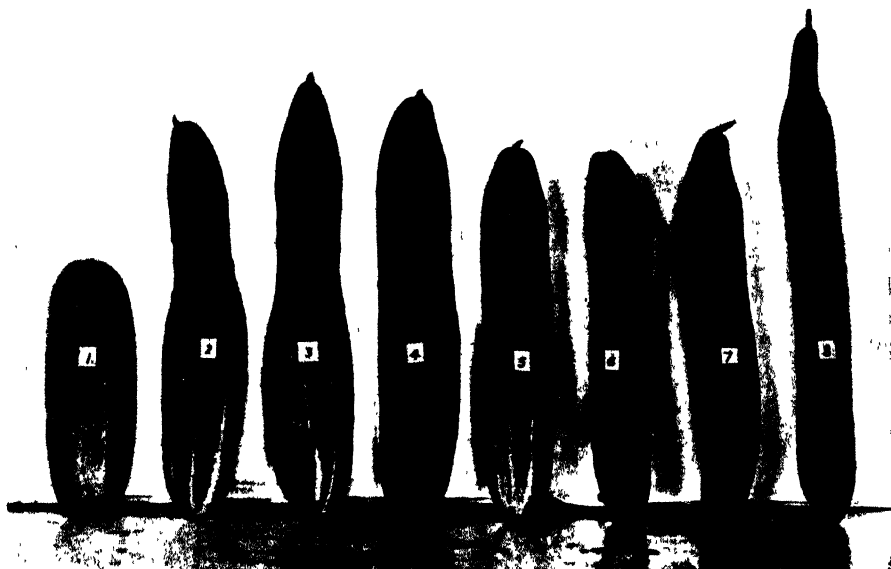
been done in crossing the Telegraph with the Early White Spine variety. The object of this cross is to get a cucumber of the White Spine or pickling type that will set its fruit without pollination as the English long type does. Such a cucumber, if it can be produced, will be of material benefit, especially to the market gardeners who grow this type of cucumber under glass, as they will then not be dependent upon artificial methods of pollination nor require to introduce bees into the

Spine cucumber as male parent in one phase of the experiment and as female in the other phase. The accompanying illustration shows the extremes that were crossed, the two parents, one on either end and the first generation hybrid fruits between them.

No. 2 in the illustration is the progeny of Telegraph (English Long Type) as female parent crossed by Early White Spine as male parent and grown in the greenhouse.

No. 3. Progeny of Early White Spine x Telegraph grown in the greenhouse.

No. 4. Progeny of Early White Spine x Telegraph grown outside.



RESULTS OF CROSSING TELEGRAPH AND EARLY WHITE SPINE CUCUMBERS
Parents on Either End with Progeny in Between

greenhouse in the winter season. An account of the results so far achieved is given in the Fruit Branch Circular for January:

The first generation cross only, so far has been obtained at the Station. The fruits and plants themselves are all intermediate in type of the two parents; but the character of setting fruit without fertilization was found to follow exactly that of the pure White Spine type, namely: that it will set only about 10 per cent of its fruit without fertilization. The result was the same whether the one or the other variety was used as the female parent; in fact, the reciprocal cross was made, using the White

No. 5. Progeny of Telegraph x Early White Spine grown outside.

No. 6. Progeny of Telegraph x Early White Spine set parthogenetically (without fertilization).

No. 7. Progeny of Early White Spine x Telegraph set parthogenetically.

The flowers of the parthogenetic fruits were covered while in the receptive stage. They contained no developed seeds.

This experiment is being carried along to the next generation of hybrids, when more definite results

may be looked for. We do not want a fruit that will not develop its seeds when fertilized, as this plant must be propagated by seeds; but one that will develop its fruits without being fertilized (in those

fruits, of necessity the seeds will not be developed) and will also develop its seeds when fertilized and transmit this combination characters to each succeeding generation.

SASKATCHEWAN

THE FEEDING OF DAIRY CATTLE

BY A. M. SHAW, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY, COLLEGE OF AGRICULTURE, SASK

THE feeding of dairy cows in Saskatchewan presents some difficulties that are not met with in some other parts of Canada. It is possible, however, to feed them successfully and profitably on the available feeds of the province. The dairy herd on the University farm at Saskatoon is fed a ration having a nutritive ratio of about 1 to 7 and is composed approximately as follows:

Cut oat straw	20	lb.
Green oat sheaves	6	"
Alfalfa hay	12	"
Pulped turnips	20	"
Oat chop	3	"
Wheat shorts	3	"
Wheat bran	3	"

In feeding, the cut straw, roots and meal are all thoroughly mixed together and fed morning and evening, about 6 a.m. and 5 p.m., respectively. The cows are then watered. The oat sheaves are fed in the morning about 8.30 and are eaten while the stables are being cleaned out. The

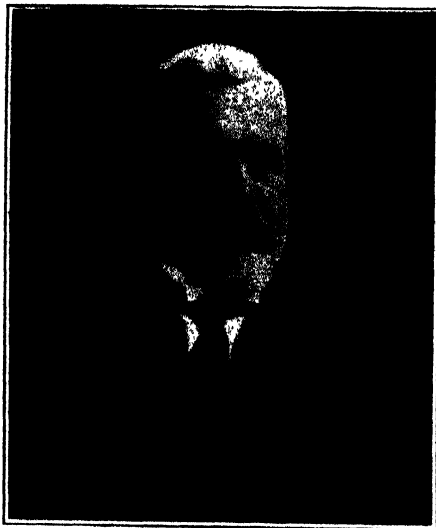
cows then are left to lie down and remain undisturbed until 4.30 p.m., when they are again watered and fed their ration of cut straw, roots and meal, and as soon as they have cleaned this up are given their allowance of hay. They are all fed in separate mangers having cement bottoms, which are also used as water troughs. The total concentrates fed per cow vary considerably, the amount being determined by the milk flow as a rule,—in general, one pound of concentrates to every four pounds of milk given. For instance a cow giving 40 pounds of milk would get at least 10 pounds of concentrates. Corn silage is gradually substituted for roots about the middle of February and is fed in the same manner, i.e., mixed with cut oat straw.

This ration is proving very satisfactory. Not only is it economical, and giving good results from the production standpoint, but the cows are all in good flesh and thriving.

BRITISH COLUMBIA

THE NEW MINISTER OF AGRICULTURE

HON. John Oliver, Minister of Agriculture and Minister of Railways, is one of the senior members of the British Columbia Legislature, having been elected to that body first in 1900. He was born in Derbyshire, England, in 1856, and with his parents came to Canada in 1870, the family settling in Wellington County, Ontario. Mr. Oliver went to British Columbia in 1877, settling in the delta of the Fraser, where he has brought under cultivation, a fine farm, the active management of which, is now in the hands of one of his sons. Of late years Mr. Oliver has been carrying on a contracting business, of which his knowledge of mechanics has helped him to make a success. The successive years of Mr. Oliver's career have seen him officiate in many capacities, as councillor, reeve, member of the Legislature and now as Minister of Agriculture and of Railways.



THE HONOURABLE JOHN OLIVER
Minister of Agriculture for British Columbia

The man who assumes to be the farmer's friend, or holds his interest dear, will constitute himself a missionary of the new dispensation. It is a contribution to the welfare of all humanity. It will strengthen the pillars of a government that must otherwise be endangered by some popular upheaval when the land can no longer sustain the population that its bosom bears. Here lies the true secret of our anxious interest in agricultural methods because, in the long run, they mean life or death to future millions who are no strangers or invaders, but our own children's children, and who will pass judgment upon us according to what we have made of the world in which their lot is to be cast.—*James J. Hill.*

PART III

Rural Science

HOME AND SCHOOL GARDENING

The principle of the school garden and of the home school garden and the methods by which they are carried on, as well as their purposes, have been fairly fully discussed, from time to time, in **THE AGRICULTURAL GAZETTE**. There is, however, a considerable variety of opinion held throughout the various provinces, as to whether the school garden or the home school garden possesses the greater educational value. The following series of articles present the experiences, with these two forms of gardens, of the officials in charge of this work in a number of the provinces:

PRINCE EDWARD ISLAND

BY J. E. McLARTY, B.S.A., IN CHARGE OF RURAL SCIENCE DEPARTMENT, PRINCE OF WALES COLLEGE

FOR many years there has been considerable discussion concerning the values of the school and home gardens. The line of demarcation has been drawn as to the location of the garden—school garden meaning a garden located at the school—home garden meaning a garden located at the pupil's home. In many respects these terms have been very misleading. For let us consider, what is the purpose of the pupil's garden? It is really the pupil's agricultural laboratory, where the problems and experiments arising from classroom work are carried out; where the pupil is able to put into practice some of the theory of the classroom; where the whole child is educated, mentally, morally and physically. The primary object of the garden should be a pedagogical one, not merely an agricultural one. Its aim should be to produce, through its proper use, better educated boys and girls. With this object in mind, the exact location of the garden is not the point, but rather the educational uses made

of it that make it a school garden. It does not matter so much whether the garden is at the school or at the pupil's home so long as the teacher is behind the pupil encouraging and directing the work.

Under ideal conditions, and by this I mean, (1) a large school ground allowing for a protected part to be used as a garden; (2) a sufficient number of older pupils to do the work; (3) a body of ratepayers who are in sympathy with and who see the necessity of this means of education; and (4) a teacher who has the welfare of the country at heart, I believe we are all agreed that the location of the garden at the school is the most satisfactory. Here a kind of ideal may be set up for the pupils and the individual experiments will be carried on under the eyes of all.

Opposed to this let us take conditions as they exist in many rural schools. The school grounds are too small to allow for a part being given over for a garden. In many cases the school seems to be crowded

out upon the road-side with the grounds unprotected by any signs of a fence. Under these conditions it would be suicidal to the cause to attempt the garden at the school. Nor should the pupils who attend these schools be deprived of the benefits to be derived from the garden. Under these conditions the best place for the garden is at the pupil's home.

In Prince Edward Island the De-

partment of Education has seen fit to encourage more of the "garden-at-home" scheme. In conjunction with this the growing of flowers, and schemes for beautifying the school grounds are encouraged. The teachers and pupils are taking up the work very energetically and successfully. Until we have a system of consolidated schools the home garden will be encouraged in preference to the garden at schools.

NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR RURAL SCIENCE SCHOOLS

IN Nova Scotia, school gardens are a failure. Home gardens are popular. The reasons for both these conditions have been discussed in previous numbers of *THE AGRICULTURAL GAZETTE*.

The only condition on which the school garden can be successful is the case where the teacher is a resident of the section and is popular. In such case, the summer vacation difficulty will be removed.

Every section has its quota of "hoodlums". They trespass on public property; but they seldom venture on private property. They destroy the school garden, therefore, but spare the home garden.

Furthermore, we have no large cities. The children of our rural districts and small towns are familiar with garden processes. The interest of novelty is lacking. These children will make a garden at home because it is really theirs. At school, they are not sure of any returns for their efforts. At home, the parents co-operate; because the products will belong to the home. At school, the parents scarcely

realize the existence of a garden.

It is easier to work at home than at school. Spare minutes can be utilized, which at school would be devoted to play.

A farmer will give his boy a load of fertilizer for the home garden. But he does not like to see it go off from the farm to the school garden.

Community spirit is not well developed yet. The school is the neglected spot of the section.

This year more than ever we want to push the *PRODUCTION* and *THRIFT* movement by means of the home gardens.

Even the demonstration plot at the school is scarcely advisable. Most farmers or farmers' boys know more about the art of gardening than does the teacher. The science of it can be taught by reference to and observation of neighbouring farm crops and farm methods.

The soil of school grounds is too often unsuitable for a garden; for the school is usually built on land that is no good for anything else. Moreover, our school grounds are not sufficiently large for proper play, to say nothing of gardening.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

BELIEVING that the school exists for the cultivation of that type of citizenship that expresses itself in progressive and productive action, we seek to connect directly with it in a concrete form as educational means, material of local importance that may be used as apparatus.

The soil, plants that grow out of it and animals that feed upon these plants, represent in rural communities, the largest part of such material.

In the school rooms these through the subjects, physics, chemistry, geography, botany, zoology and nature, in their elementary phases are dealt with experimentally and objectively. In order to do this to the greatest advantage, to furnish opportunity for careful observation, to clearly demonstrate facts elucidated in the classroom, the garden on the school premises becomes a real necessity.

The garden is the outdoor laboratory that applies and tests the conclusions of the indoor instruction, and it thus connects the school with the activities of real life. The susceptible period of child life is seized upon not only to give him a broader and more definite form of education, but to give him a bent toward the salient features of the community and to interest him in applying his education not only for personal gain but for general local development.

When the school as the centre of education in a district utilizes these two features, indoor experimental instruction and outdoor laboratory work, each in harmony with the other, and logically related, the natural outgrowth is the home project work. What one knows, what one likes to do because of the intelligent process through which he has learned, suggests naturally problems of a similar kind that with freedom he desires to work out.

Especially is this true when these problems are along lines that engage the attention and form the business life of the majority of the residents of the district.

In so far as our experience goes all home plot work has emanated in this province from the school, with gardens on the school grounds or on near-by sites. In 1913 there were about 20 such school gardens, now there are nearly 100. In 1913 there were no home plots, in 1914 there were 59, in 1915, 378, in 1916, 727. Besides these 146 pupils in schools carried on home project work in poultry.

There is much ahead for us to accomplish, there is much to do before the plans thus far worked upon will be giving thorough going results.

The difficulty the summer vacation presents is being dealt with. We recognize that it is a difficulty. The home plot work is helping by its influence in the solution, as the school garden helped and is helping the home plot work. More well kept school gardens were found in the province during last year than at any previous time. The school fair is another agency that is helping since children exhibit the produce from their plots there. With summer supervisors for both school gardens and home plots assembling the pupils at the former and visiting them at the latter, giving pupils instruction and encouragement, another step will be taken that will unite school and home interests in a way beneficial to entire communities affected.

Children spend six hours per day for five days of the week in the school house or on the school premises. If the grounds are left unimproved and barren, the influence on the minds of the pupils who are receiving their education cannot but be undesirable.

QUEBEC

BY JEAN-CHARLES MAGNAN, SUPERINTENDENT OF SCHOOL GARDENS

I AM firmly convinced that the "school garden" and the "home garden" are closely linked together by the elementary teaching of agriculture in the public schools.

Judging by the results obtained in our province, I may say that the home garden should be the logical consequence of a good system of agricultural teaching in the schools. It naturally follows therefore that all our efforts should at first be concen-

The conclusion was that both gardens are necessary, the school garden being the laboratory, and the home garden the practical field.

Thus, the school garden is the laboratory, where pupils learn the practical elements of horticulture, and the home garden the experimental field, where they may apply the experience acquired in the school garden. We have found, however, that in the matter of organizing and visit-



SCHOOL GARDENERS AT WORK IN THE EXPERIMENTAL SCHOOL GARDEN, ST. CASIMIR, QUEBEC

trated on the improvement of the school garden. The home garden is the complement of the school garden. It is the result of the persistent endeavours of the teachers, seeking to impart to the pupils a liking for the soil, and to give them, through the practice of horticulture at school, an initiation in practical agriculture.

At the convention of the "School Garden Association of America", held last July and which I had the privilege of attending, I noted that pedagogic authorities and specialists in agricultural teaching were in favour of both school and home gardens.

ing, home gardens present serious difficulties and require a great deal of work. Therefore, for various reasons, home gardens have so far been encouraged only in those districts where school fairs are held every fall.

There are now in the province 17,886 pupils having school gardens, 8,725 having both school and home gardens and 1,322 cultivating a home garden only.

Mr. V. E. Kilpatrick, of New York, president of the School Garden Association of America, states that "it is necessary to maintain a garden at the school building, how

ever small that garden may be, in order to increase the valuation of home gardening in a community. The child does at home what he learns to idealize in school. Gardening is not worth while for a child unless his teacher shows him by example that it is worth while."

In conclusion, teachers are advised

to arrange for a school garden in the first place; then, later, if they find it possible to do so, to organize home gardens. The services of sixteen inspectors of the Provincial Horticultural Division have been placed this year at the disposal of the teachers in various counties, for visiting home gardens.

ONTARIO

BY J. B. DANDENO, PH.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

THE methods of carrying on school garden work may be very variable, depending upon local conditions, the material at hand, and upon the personality of the teacher. Good results are sure to follow any well organized method so long as the educational feature is kept in the foreground.

In the early history of the On-

tario Agricultural College, the farmers looked askance at the farm in connection with the college, because it did not pay for the up-keep of the institution. They have since learned that the results were in the students and not in the treasury. They failed at first to see that it was the chief function of the college to train men rather than to produce financial



FIG. 1. SCHOOL PLOT S. S. NO. 12, SOUTHWOLD, ELGIN COUNTY

profits from the fields and barns. The same is partly true at the present time with respect to school gardens. The public is frequently a severe critic and occasionally very unfair. A school garden may be a first-class success, and yet not produce ten cents worth of marketable stuff. At the same time, unless the garden can be made to show first-class results in the way of produce, there is room for improvement.

The school gardens in Canada in 1917 should be devoted entirely to plants of food value. The war conditions urge this matter upon us.



FIG. 2. PUPILS OF SAME SCHOOL, PLAY AFTER WORK

As a general rule, however, a fair proportion of decorative plants should be grown.

As a rule, a small garden well cared for would be more effective than a large one showing lack of attention. This garden should, if possible, be on the school grounds and also in public view. Every plot should be so managed as to answer some question. A community plot of an experimental character can always be made interesting and should have a label in sight of the public.

The care during summer vacation can be managed if experimental plots are a part of the garden. The interest in connection with such demonstrations is usually strong enough to attract members of the school during vacation to provide the necessary care. The illustration here given shows a class on the school plot in July, 1916.

The most important factor in the successful operations of a school garden is the teacher. For Ontario, there is a good course given during the summer sessions, but this is not everything. The teacher must be

alive and something of a leader. Last fall, owing to a very dry season, the season for fall ploughing was very short. During this season the school garden (in a certain school) needed to be ploughed, and the teacher was told that the school garden would have to go unploughed, but she thought otherwise and went to a neighbour ploughing in his field and asked him if he could spare time for the work. He said he thought he could and ploughed the garden. In a day or two after this, the teacher asked him for his bill and came nigh insulting him. He replied: "It would be a queer thing for

me to make a charge for ploughing a few 'bouts' for the teacher's garden". The country has plenty of such farmers, but such teachers are not so common.

The time may come when the garden will be monotonous, if the same routine is followed year after year, but the work and management of the school garden can be varied without limit and this problem of gradual variation is not receiving attention from those who have recently received elementary certificates in agriculture.

MANITOBA

IN the report of the Department of Education for the year ending June 30th, 1916, a number of school inspectors refer to the school gardens and home gardens within their inspectorate.

Inspectoral Division Number 5. G. Hunter.—Over ninety per cent of the schools in this inspectorate had school gardens this year. As usual these were well cared for until the summer vacation, when, generally lack of further interest and changes in the teaching staff militated against the pupils reaping the final results of their labours. If "Home Gardens" were more general and carried on in conjunction with boys' and girls' club work a greater interest would be created among our boys and girls in agriculture. It would help to bring the life and

interests of the school more closely into contact with the home life of the pupil. It would help to encourage the boys and girls in a common and national appreciation of the beautiful in nature as well as give them something definite to do, something which they can call their very own. If "school gardens" fail to produce the desired results, let us encourage "home gardens", and so help to link the school activities with the home.

Inspectoral Division Number 6, A. B. Fallis.—About eighty per cent. of the schools have gardens. Home gardens have been receiving more attention. I believe every boy and girl should have a small garden at home and this need not interfere with the school garden.

SOUTHERN SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF AGRICULTURE

UP to the present time in Southern Saskatchewan gardening in connection with school work has been conducted almost entirely in gardens on the school grounds. In the few cases where the work is undertaken at the home of the pupil it has been usually due to the fact that for some reason the school grounds were unsuitable. The school garden seems to be a necessary first step in the work. Here the pupil's interest is awakened and he receives from his teacher such instruction and assistance as are required by the beginner. In these early stages it is generally found that a social interest is developed by all the pupils working together, and this is an important factor in the initial success of the undertaking. Until the children have a deep interest in and real liking for the work, it is rather difficult for the teacher to

keep alive the right spirit of enthusiasm even in the school garden where a community interest is usually engendered. And this becomes still more difficult when the pupils are cultivating gardens at home where they have to work alone. In the rural districts of Saskatchewan this loneliness is more keenly felt because of the great distance between homes. As a rule, children are happier and their interest in any particular subject is more easily maintained when they are working in groups.

Undoubtedly, the success of school gardening may to a certain degree be measured by the extent to which home gardening under the auspices of the school is afterwards developed. The linking up by home gardens of the home and the school should be one of the aims of the teacher, and this cannot be accomplished until a proper foundation for the work has

been laid by means of the school garden. Providing the direction and instruction furnished by the school is based upon the educational values of the work it matters not whether the garden be at school, on a vacant lot or at home. Even when a scheme for successful home gardening,

directed by the teacher, has been formulated, the garden at school is still necessary as a laboratory where problems arising from the child's work may be dealt with, and where investigation and demonstration of an advanced character may be conducted.

NORTHERN SASKATCHEWAN

BY FRED W. BATES, B.A., M.Sc., DIRECTOR OF SCHOOL AGRICULTURE

THE relative value of the school garden and the home school garden has not been demonstrated to any extent in Northern Saskatchewan, as the use of the latter has been accidental rather than premeditated. In most cases the garden at home has been undertaken when through lack of fence or of suitably prepared ground or even of room it has been impossible to have a garden at the school.

The only instance of well-planned home school gardens found in the north is provided by the city of Saskatoon, which has carried on this type of work for a number of years with sufficient success to merit continuance. Last summer school gardens were made at each school, but only for such pupils as did not have facilities at home for the carrying on of garden work. The home school garden is always voluntary and therefore it is possible for many children to miss the opportunity of taking part in these activities.

It is not possible, therefore, for me to draw conclusions from my experience with home gardens or to determine the relative value of the two forms of school gardening. In the endeavour to find the best type of work for our conditions, however, the problem must receive consideration and certain points at once force themselves upon our attention.

In its initial stages the school garden must be simple and, in order to develop right habits of observation, it must be under the direct and con-

stant supervision of the teacher. It is much easier to preserve this simplicity and to carry out this supervision with the garden at the school. In fact it is almost an impossibility to properly carry on the work with the younger children if the garden is anywhere but closely related to the school grounds.

On the other hand, it must be borne in mind that habits of life may be so closely linked up with certain activities that when these activities cease the habits have little force and soon lose their effect. It would seem necessary, therefore, in the planning of our school garden work to so relate that work to the home activities that when the child leaves school it will not lose the habits of close observation that the school garden has developed. Here seems to be the greatest place for the home school garden. If the activities of the garden and the methods of carrying on the work can be connected in the child's mind with home as well as with school activities, the leaving of school will not so easily affect the habits formed in connection with the garden operations. In its later stages school gardening becomes more complex, problems are attempted that would have no value for the younger children, experimental work of many forms are introduced for the purpose of stimulating the mind and forming habits of careful observation and rigid inquiry. If in this phase of the work the garden be carried to the home, these habits will become more

effective and less easily broken when the child leaves school.

It would seem, therefore, that during the earlier phases of school gardening when simplicity is paramount the work should be done under the direct and constant supervision of the teacher and therefore on the school grounds, but later, when it becomes more varied and practical in its bearings it should be so closely

linked up with his home life that when the child leaves school he will not be inclined to drop the activities or break the habits formed in connection with the school garden. For the earlier grades school gardening, for the higher grades a combination of school and home gardens with the home garden predominating in the final year, would appear almost ideal.

ALBERTA

BY JAS. C. MILLER, PROVINCIAL DIRECTOR OF TECHNICAL EDUCATION

THE school work to which home gardens and school gardens are related primarily, is the course of instruction in practical agriculture and gardening. The school garden and the home garden should not, even in our thinking of the problem, be placed in opposition one to the other as alternative schemes. Any adequate plan for effective instruction in practical agriculture requires the classroom lessons, the demonstration and investigation of the school garden and, as a final checking of the plan and purpose of the whole school course, the forming of the habit of utilizing the instruction and experiences gained at school, in the daily life of the children at their homes. In our scheme of work in Alberta, each forms an integral and essential part of the plan for agricultural instruction in the elementary schools, rural, village and town.

The interest of the pupils and parents in the school and home garden work should be stimulated in order that such work may be undertaken and developed to a point where they become alive to its value and awake to its many interesting features, and to the requirements of intelligence in its management. The exhibition of garden products at the annual district fairs, the organization of school fairs, boys' and girls' clubs, and the arranging of special com-

petitions have been the usual ways of doing this. All these are good and serve other worthy purposes as well as that of encouraging the gardening.

In regard to all garden work and schemes connected with it, we hold the view in this province that the teachers should not fail to become acquainted with the various organizations of the locality which are, or should be, connected with, and interested in, this means of education. Let him or her join such. They will include agricultural societies, horticultural societies, women's institutes, farmers' institutes and other organizations, such as the United Farmers of Alberta or the United Farm Women of Alberta. It is desirable to have such organizations co-operating more directly than is often the case with school work and the pupil's work at home. Let the schools be, as it were, the younger partners of these societies, whose interest and co-operation will help and stimulate the pupils in their work. These organizations can help in forming similar school organizations in other districts, in offering prizes, encouraging competitions and in enlightening by the example of their accomplishments.

The following plans are recommended for fostering home gardens:

1. Teacher should work as largely as possible through the parent, to get opportunity for the child, and get him to com-

mence work. Teacher should act as counsellor, friend, adviser, or inspector, visiting the home garden as often as possible.

2. Pupils who agree to do home garden work may be given some of the seed, etc., used in the school garden; reports on what is attempted and accomplished should be handed in and comparisons made between the home and school work.

3. The teacher's influence should be

brought to bear directly to get pupils to agree to plan and plant a home garden.

4. Clubs and other agencies promoting competitive work should be encouraged. Have judges go around to judge the crop. Prizes may be given.

5. A project may be chosen and assigned to be carried out at home, e.g., which kind of beet, or which root vegetable withstands frost best; or, on seed selection. Certain lessons in school may be based on this home work.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

IT will be conceded by everyone who has thought at all upon this subject that the educational rather than the economic or industrial value of school or home gardening should have first consideration. This is particularly true in connection with the work when carried on with boys and girls of public-school age, and the younger the pupils the greater is the relative importance of the educational aspects of the work.

As a ready-to-hand means of instruction, therefore, -one which the teacher can make daily use of as he uses his blackboards or school maps, --there is no doubt but that the school garden has great advantages over the home garden. The school garden, moreover, affords a valuable relief to both pupils and teachers, from the constant round of school-room exercises and seems to supply a needed mental as well as physical stimulus which has a beneficial effect in class-room work. Teachers and pupils together are able to trace day after day the constant change and development going on in the gardens at school, and to suit the treatment of these gardens to the varying conditions much more effectively than if the gardens were at the children's homes.

Another important advantage which the school garden has over the home garden is the stimulus afforded to the pupils themselves. They see the results of each other's work

daily, and are thus encouraged to devote their best care to make the gardens as good as the best. From a social standpoint, also, the school garden is infinitely superior to the home garden. I have never seen a group of children more happy anywhere than in their school garden, discovering and discussing the relative merits in beauty of form and colour of the flowers in their respective plots. This adds much to what teachers so much prize in school, viz.: the spirit and tone or atmosphere of the school. It is an attitude of mind and a spirit of sympathy and mutual helpfulness, that is better appreciated than described. It does much to lighten the burdens of the day.

CORRELATION OF WORK

The school garden when at its best becomes an all-important centre of interest, strongly concrete in character and capable of daily and almost hourly application in connection with the teaching of other school subjects. In this way it helps to make these school subjects and school life generally more vital and purposeful to the children. It is at this point that we should distinguish the teaching of gardening and agriculture from the education and training of children through gardening and agriculture. We have a long way to go yet before the latter ideal in school gardening will have been reached.

It is, of course, possible to so conduct home gardening that the teaching of other subjects will be benefitted by it, but not to the same extent nor with the same facility in direct method as in school gardening. In this particular the home garden is on a par with a correspondence course as compared with an intra-mural course.

THE SUMMER HOLIDAYS

It has always been said that the summer-holiday difficulty is the most serious drawback to school gardening and that this difficulty is largely removed by having the gardens at home rather than at school. This is not always the case. It may be partly true in rural districts, but it is largely untrue in cities. One of the most earnest and capable teachers in this province, who is the principal of a city school where home gardening was tried last year, in reporting on his work said in part: "About 90 children took part in the home-gardening work and up to the time of closing school in June all of the gardens were in a more or less flourishing condition. After the summer vacation, at the time of my September inspection, a much different state of affairs prevailed, for not over ten per cent of the gardens were worth inspecting." This failure was due to the fact that most of the pupils left their homes in the city for the summer and in many instances did not return until the re-opening of school. In the case of a school garden provision can easily be made for taking care of the children's gardens at a small expense, but not so in the case of home gardens for individual pupils.

THE REAL PLACE FOR HOME GARDENING

There is, however, a place where home gardening is at its best. Whilst, of course, it can and should be used with all public-school grades when school gardens are impracticable, it is best suited to boys and girls in the two highest grades (Grades 7 and

8, or Form IV), who during their primary and intermediate-grade work took up school gardening. It is really school gardening applied to a definite agricultural or horticultural project. The elements of gardening practice having already been acquired during the earlier years in school gardening, the individual pupil is now ready to undertake independently a home project in gardening or horticulture. In other words, school gardening, which is more broadly educational in its bearing, is the logical antecedent of home gardening, which is rather narrower in its scope and which, as a rule, makes somewhat larger demands upon the individual pupil.

HOME GARDENING AND OTHER HOME PROJECTS IN RELATIONSHIP TO THE SCHOOL FAIR

There is a danger which is becoming more and more apparent in Canada, that some teachers and agricultural leaders are coming to regard home gardening and related agricultural home projects as a preparation on the part of the pupils for the holding of a large and sensational school fair,—one which will attract many people, and the success of which is too apt to be estimated in the number of entries and the size of the crowd. The school fair has, undoubtedly, an important place to fill as an agency in arousing interest in the work of the school amongst the people, as well as amongst the children themselves, but it should only be regarded as one incident—and not the final one either—in the year's work in agricultural education. We seem to be coming into a condition of overstrain in competitions and prize-winning. Recognition or even honourable distinction as a result of careful, consistent and honest work throughout the year must be approved by everyone, but to make the winning of such distinction the chief incentive in the doing of the work is, educationally, as well as morally, bad.

To try to overcome such tendency we have decided that in future three scores will be taken into consideration in awarding prizes at school fairs, as follows:—

(1) Excellence of work done by pupils throughout the season, as shown by teachers' reports and scoring of home projects—100 points.

(2) Excellence of exhibits at School Fair—awards made on points with numerical value attached—100 points.

(3) Pupils' records for the season, such records to include financial statement, record of work done and observations made under date, and all illustrative drawings, charts, or tables—100 points.

It is better to arrange separate prize lists for second, third and fourth-reader classes when pupils in these classes are taking part in the competition. Garden score cards are supplied by the Department to teachers conducting home-gardening work.

ONTARIO

INCREASED FOOD PRODUCTION

CIRCULAR SENT BY HONOURABLE R. A. PYNE, MINISTER OF EDUCATION TO SCHOOL INSPECTORS AND TEACHERS

IN order to assist in meeting the shortage of foodstuffs, due to war conditions and the unfavourable season of 1916, those teachers who are now giving instruction in agriculture and horticulture in the provincial schools should arrange as far as practicable to grow plants of food value in school gardens and to reduce correspondingly the space hitherto devoted to flowers and decorative shrubs. With the same object in view, the home garden projects should be enlarged and modified and extensive use made of vacant lots and other unoccupied areas. In this way advantage might be taken of the potential labour of boys and girls from eight to fifteen or sixteen, much of which in the ordinary course of events is not utilized.

Inspectors might also take advantage of present conditions to enlarge the scope of agricultural education

in Ontario, and to demonstrate more fully the important bearing which agriculture has upon the welfare of the people, by using their influence to induce school boards which have not yet established classes in agriculture to undertake this work and to utilize the school garden or home garden as recommended above.

If, indeed, the urban municipalities in Ontario having a population of from 1,000 to 9,000 would double the present production of their gardens and poultry yards, and use, as recommended above, the vacant lots and other unoccupied areas, it would increase the food products of Ontario by \$10,000,000 at a very conservative calculation.

Boys and girls cannot be expected to fight, but, by assisting in increasing the supply of foodstuffs, they also can be of service.

Live stock will continue to be, as it has always been in the past, the most important factor in successful farming, and it looks as though its importance is likely to be multiplied many times for some years to come by the war. He who can conserve his live stock will surely reap a reward and in addition will perform a patriotic service for his country and Empire.—*Professor G. E. Day.*

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

PROGRESS OF PURE SEED PRODUCTION IN CANADA

BY L. H. NEWMAN, B.S.A., SECRETARY, CANADIAN SEED GROWERS' ASSOCIATION

THE food situation in Canada at the present time, and the appeals which are being made throughout the Dominion to produce still more food this coming year, brings with it certain problems. One of the first and most important of these problems is that of securing good seed and of impressing upon the rank and file of growers the importance of sowing the very best that can be had. Ontario will require, approximately, 12,000,000 bushels of seed this spring; the three western provinces will require much more—about 20,000,000 bushels—and Quebec and the three Maritime provinces will require approximately 7,000,000 bushels. In ordinary seasons the majority of farmers grow their own seed, although a considerable percentage has to buy, and the total amount actually bought runs into thousands of bushels. The season of 1916 was not an ordinary season, especially in Ontario, with the result that a large proportion of the farmers in that province will have to buy their seed grain, and even their seed potatoes. Fortunately there are parts of Canada where good seed wheat, oats, barley and potatoes were produced in 1916, and in these districts good seed is available in considerable quantities. I refer now particularly to Prince Edward Island as a source of seed oats, to New Brunswick for seed potatoes, to Central Ontario for barley, to South-western Ontario for seed corn and to parts of Western Canada for both wheat and oats. Scattered throughout these districts are to be found members of the Canadian Seed Growers' Association who, by virtue of the system which they are following, are producing seed of certain known varieties. In some cases these members have grouped themselves into what are known as "Seed Centres", and it is here that the largest quantities of seed of a given variety can be obtained. In a previous number of THE AGRICULTURAL GAZETTE, (August 1915), a list of seed centres in Canada was

given, and the work they were attempting to do was outlined. As was intimated then, all of these seed centres would not likely make a success of the undertaking, but some of them have made considerable progress. Some of the best centres, such as the North Gower Banner Oat Centre, North Gower, Carleton county, Ont., which in the spring of 1916 supplied several thousands of bushels of good seed, is this spring offering very little, and, in fact, some of the members may actually have to purchase seed for their own use. Anticipating this situation care was taken at the beginning, to encourage the organization of centres in widely scattered districts throughout the Dominion, in order that there never would likely be an absolute shortage. It is difficult to give accurate figures at this date, showing the quantity of seed actually produced in these centres in 1916, but reports received thus far indicate that a good many thousand bushels of good pure seed were produced, and we are now depending to quite an extent upon these institutions for our supplies.

Although the season of 1916 was decidedly unfavourable in Ontario yet there were places where excellent seed was produced but not in large quantities. In some of these places efforts have been made during the past three years to encourage the organization of seed centres, but without success. Had the people in these districts realized the possibilities associated with conditions such as now prevail and had gone ahead with their centres in a businesslike way they would not only have profited handsomely in their undertakings, but would have rendered a real service to other farmers in the province, who have to bring their seed from long distances entailing high freight charges.

The Canadian Seed Growers' Association has been among the foremost institutions to urge farmers who are suitably situated and whose farming methods per-

mit it, to endeavour to grow grain of such a high degree of excellence as to make it suitable for seed. These efforts have not been altogether without success, but the fact remains that still greater efforts must be put forth in order to insure a larger quantity of good seed here and there throughout the country and within shorter distances of those who have to buy. Experience indicates that where carload lots of seed are wanted, farmers can produce this seed through co-operative effort, that is through seed centres, with less expense and with greater satisfaction than where they try to operate as individual members of the association.

SEED CATALOGUE

Seed produced by members of the Canadian Seed Growers' Association is listed in a catalogue during the early winter. This catalogue contains the name and address of the grower, the variety he is growing, the quantity he has for sale, price asked, the germination and the certificate number. These catalogues are distributed widely throughout the Dominion and every effort is taken to give the seed offered by members every possible publicity. In this way the grower and the purchaser are brought directly together. The catalogue for the crop produced in 1916 is now (Feb. 5th) practically ready for distribution and those who desire to purchase seed should send to the Secretary of the Association, Canadian Building, Ottawa, and obtain a copy.

INSPECTION

The system of inspection both of the growing crop and of the seed in sacks

before the latter are shipped, practically guarantees the identity, quality and purity of the seed. So great is the confidence of the buying public in "registered seed" that the supply is not equal to the demand. Our best seed houses purchase large quantities of registered seed and retail it to farmers without breaking the seal. Growers are often glad to sell their entire lot to a seed house for a fair price rather than retail it in small quantities.

The number of individual farmers who are applying for membership in the association has not increased very materially in the past year, owing, presumably, to the shortage of labour. This will mean not only an added burden upon the seed centres already established, but also an added opportunity, and it is hoped that this opportunity will be seized energetically this coming season. The whole problem is a national one and should be regarded as such by those who have it in their power to do something. In a country whose borders are separated by such enormous distances, it is difficult to organize this work as efficiently as one would like, but if the farmers of the country generally will do what they can this coming season to produce and set aside even a small quantity of the grain they harvest, to be used in 1918 for seed, they will render a valuable service to their country.

All growers who would like to affiliate with the Canadian Seed Growers' Association and receive specific direction and guidance in their work should communicate with the Secretary, Canadian Building, Slater Street, Ottawa, Ont.

VEGETABLE GROWING BY GIRL GUIDES

THE Ontario Department of Agriculture through its district officers, is able to afford assistance to many forms of rural activity. Through the agency of a company of "Girl Guides", useful work was done at Thamesville in the county of Kent, in the form of vacant lot gardening.

For a plot the size of a city lot 132 by 33 feet, the District Representative supplied seed of potatoes, vegetables and flowers and gave instruction for the cultivation of these crops. A keen interest was taken in the work which yielded a very enjoyable season, a widened experience in growing things and a revenue for patriotic expenditure.

The following report is provided by Miss Catharine M. Duncan, Captain of the Thamesville company of Girl Guides:

1. Size of plot. . . . 132 feet by 33 feet = 1-10 acre.

2. Preparations of ground. . . Matured and fall ploughed in 1915. In 1916, on May 1st, disced twice, May 5th, harrowed twice and staked out.

3. Amount of seed used. . . 1½ bushels.

4. Observations with dates (growth, uniformity blossoming, etc.) Planted May 8th and 9th, 1916 in 12 rows (each row 132 feet long and its care allotted to one individual Guide) 6 rows to No. 1 Thistle Patrol and 6 rows to No. 2 Aster Patrol. Very wet weather at planting and several weeks following.

5. Dates of spraying and material used. . . . Sprayed with Bordeaux Mixture (2½ gallons of mixture diluted and with 1 oz. Paris Green added against beetles that were very bad). Sprayed June 24th, July 8th, July 15th, July 29th, and August 5th (five times).



OLD GENERAL ELM, WHO GUARDED THE
EAST FRONT OF THE FIELD AND A
GLIMPSE OF THE COSMOS AND
ASTERS

6. Cultivation (kind and dates). Hoed with hand hoes, three times a week in July and August. Cultivated once with

horse cultivator on July 6th. Twice the beetles were picked off by hand into tin cans and burned.

7. Cost.... Land was given by Captain, Seed was given by Ontario Department of Agriculture. Extra labour and spray cost \$1.50.

8. Yield of Plot .. $5\frac{2}{3}$ bags or $8\frac{1}{2}$ bushels.

9. Value of crop. . . Eleven dollars and thirty-five cents.

10. Profit, not including labour \$11.35—\$2.10 for labour and spray. —Clear profit, \$9.25.

11. Date of Harvest . . . September 21st, 1916.

The plans of the Thamesville Company of Girl Guides are as yet chaotic for 1917. Suggestions receiving consideration:

1. That with the help of the managers of the local canning factory, they may grow beans or sweet corn.

2. A pickle factory has offered them inducements to grow cucumbers.

3. Individual Guides may grow vegetables on plots of their own, with a percentage turned into patriotic funds.

The most practical plan yet suggested is that the plot worked in 1916 be kept on for purely experimental and demonstration purposes with whatever vegetables and flowers are voted on by the local Guides as most interesting to them. That each individual patrol obtain the use of some vacant lot in her neighbourhood and grow thereon, for experience and for profit, whatever crop seems most desirable. Thus there seems no dearth of ideas for extending the work on into next year, and the following years.

Home Economics may be presented through correlation with other subjects; for example, food may be considered in the nature study, physiology, or school garden work. The cooking may be made the means of introducing the hot school lunch; it may serve the purpose of developing the school as a social center; or it may be carried on largely as home project work and thus increase the child's interest in the activities of the home. Sewing may be used to arouse an interest in the beautifying of the school, as well as in the making of the useful cap, apron, towel and holder, to be used in the cooking lessons. Instruction in sanitation may be made the means of keeping the school and its surroundings in a sanitary condition so that it may serve as a model for the home. Taught in this way the subjects readily find their place on the programme.—*Dr. P. P. Claxton.*

ASSOCIATIONS AND SOCIETIES

THE PRINCE EDWARD ISLAND EGG AND POULTRY ASSOCIATION

BY WM. KERR, MARITIME POULTRY REPRESENTATIVE, DOMINION LIVE STOCK BRANCH

THE annual meeting of the Prince Edward Island Co-operative Egg and Poultry Association was held in Charlottetown, January 23rd and 24th, 1917. The following report of the year's business was submitted:

Total eggs handled	812,595 doz.
Extra Grade	720,760 "
No. 1	91,835 "
Per cent extras	88.7

The officers for the ensuing year are as follows:

President, Rev. P. P. Arsenault, Mt. Carmel; 1st vice-president, Edward Bulpitt, Cardigan; 2nd vice-president, J. B. Millman, Long River; 3rd vice-president, A. Schurman, Central Bedeque.

DIRECTORS: Prince county - Rev. Dr. P. C. Gauthier, St. Louis, J. D. McLellan, Richmond; Queens county - John E. Sinclair, Emerald, B. R. Brown, York; Kings county - D. F. McDonald, Souris, Preston Campbell, Montague.

The Prince Edward Island Co-operative Association is an organization of farmers working towards increased production and improvement in quality of farm poultry and poultry products in Prince Edward Island.

The movement was inaugurated in 1912 by The Dominion Live Stock Branch

through the Poultry Division, and grew with such rapidity that it was deemed advisable to centralize the work, and accordingly the present organization came into being.

Fifty-one egg circles are represented on the Board of Directors, comprising a membership of over 2,700 farmers.

Financially the organization is very strong, and the accounts show a turn-over of nearly a quarter of a million dollars.

The association maintains a warehouse in Charlottetown, with a floor space of 12,222 square feet. Here the eggs are received from the country and are candled and graded every day in the year by a staff of competent men employed by the association.

The trade is supplied with a guaranteed article in carload lots, and the producer is paid on the "quality basis" for his eggs.

The result is that the association is unable to supply the orders that deluge the office from satisfied buyers, and the country is becoming dotted with new up-to-date poultry houses, that are being erected by the farmers in an attempt to supply the increasing demand for the quality article. Poultry keeping has become one of the most important branches of Island Agriculture.

THE NOVA SCOTIA POULTRY ASSOCIATION

THE annual meeting of the Poultry Association of the province of Nova Scotia was held at the Agricultural College, Truro, on January 11th, 1917. The secretary, J. B. Landry, presented a report of the work done over the province. Ten club shows were held in as many different counties. After discussion, it was decided to ask the Dominion Department of Agriculture, and the Director of Experimental Farms, to put on exhibition an educational exhibit of poultry and eggs at each and all of the provincial club shows. It was further decided that the secretary endeavour to secure the consent of the Commissioner for Agriculture to use some

of the funds allotted to Nova Scotia, under the provisions of THE AGRICULTURAL INSTRUCTION ACT, to help out the poultry show's prize list.

The election of officers for the ensuing year resulted as follows: President, Mr. Fred Bath, Bridgetown; vice-president, Mr. E. E. Freehill, New Glasgow; executive committee, W. F. Mattinson, Glace Bay; Frank E. Jackson, North Sydney; C. F. Bowes, Halifax; W. W. Osborne, New Glasgow; H. M. Petter, Yarmouth; Thos. McDonald, Antigonish; secretary-treasurer, J. P. Landry, Truro, N.S.

THE NOVA SCOTIA FRUIT GROWERS' ASSOCIATION

AT the 43rd annual meeting of the Nova Scotia Fruit Growers' Association, held on January 16th, 17th and 18th, 1917, a number of resolutions were passed and adopted. Among these were the following:

Resolved that in the opinion of the association, it is advisable to define No. 3

apples by introducing the words "shall contain no culls".

Resolved that the Nova Scotia Fruit Growers' Association again petition the Dominion Government to make further effort to increase the output of fish fertilizer from the dog fish reduction plants. During the past year, no fertilizer gave

more satisfactory results in the Annapolis Valley than the fish fertilizer secured from the dog fish reduction works at Canso and Clark's Harbour, Nova Scotia.

In view of the fact that the green apple bug is causing an enormous loss to the fruit growers of the Annapolis Valley and

as this pest is a very difficult one to control, it was Resolved that the association petition the Provincial Government to appropriate the necessary funds to conduct a series of demonstrations on the control of this pest at several points throughout the Annapolis Valley.

THE MAPLE SUGAR AND SYRUP CO-OPERATIVE ASSOCIATION

THE annual convention of the Pure Maple Sugar and Syrup Co-operative Agricultural Association was held at Victoriaville, Que., on January 23rd and 24th. The sessions were well attended. Many farmers came long distances to be present. An exhibition of sugar and syrup was held. Prizes amounting in all to one hundred dollars were won by thirteen exhibitors. There was a good display of machinery and equipment for making sugar and syrup.

The programme consisted of lectures and discussions on the making, packing and marketing of maple products. It was brought out in the meeting that the law

passed in 1915 calculated to protect the interests of makers of pure maple sugar and syrup is not being sufficiently enforced. A resolution was passed calling upon the Parliament of Canada to so amend the Adulteration Act as to give officers of this association power to enforce the law.

The following officers were elected: President, Gustave Boyer, M.P., Rigaud; vice-president, Chas. A. Fisk, Abbotsford, Que.; secretary-treasurer, Jos. H. Lefebvre, Waterloo, Que.; directors, R. T. Brownlee, Hemmingford, Que.; J. H. Grimm, Montreal, Que.

THE QUEBEC BEEKEEPERS' ASSOCIATION

THE annual convention of the beekeepers' association for the province of Quebec was held in Montreal on the 15th and 16th of November, 1916, at the Monument National. There was a very large attendance.

Lectures were given by the following: M. Jean Charles Magnan, District Representative of St. Casimir, county of Portneuf, on "Bee-keepers and School Gardens"; M. J. F. Prud'homme of Ste-Philomene, on "One Year Spent with Bees"; M. Art. Vaillancourt, of the firm of J. A. Vaillancourt of Montreal, and director of the association, on "Grading, Packing and Marketing Honey"; M. Jacques Verret, on "Bee-keeping in the Quebec District"; le Docteur Lalonde, on "The Fire Weed as a Honey Plant"; M. Jos I. Beaulne of the Dominion Department of Agriculture, Ottawa, and Mr. Morley Pettit of the O. A. C., Guelph, Ont., on "Foul Brood"; M. E. A. Fortin, on "Honey and its Value as a Food"; M. Auguste Trudel, Manager of the Quebec Agricultural Cheese Makers' Co-operative Association, on "Agricultural Co-operation and the Quebec Bee-keepers"; M. A. L. Beaudin, on "Apiculture in the Province of Quebec"; M. E. Barbeau of St-Eustache on "Rearing Queens"; M. Chs. Peloquin of St-Hyacinthe, on "Feeding Bees with Sugar"; M. F. W. Sladen, Dominion Apiarist, on "Wintering Bees"; M. Michel Dufault, on "Spring Treatment of Bees".

A very interesting exhibition, including classes for extracted honey, wax, bee-hives in sections, etc., was held in connection with the convention. A special prize offered by the Hon. Minister of Agriculture was won by M. F. X. Clermont of Berthier.

RESOLUTIONS

The following resolutions were passed: (1) Resolved that the Hon. Minister of Agriculture be urged to appoint additional inspectors to help the inspectors that are now on duty, as it is well recognized that the latter have not sufficient time to visit the foul brood infested districts, and that these new inspectors be selected among the assistant inspectors who have been inspecting for several years and who, therefore, are best qualified for this work.

Resolved that the law respecting the control of contagious diseases among bees be amended. The Minister is requested to adopt a law similar to the Ontario law, and which contains the following stipulations: The inspector shall have full power, in his discretion, to order any owner or possessor of bees dwelling in box hives (being mere boxes without frames) to transfer such bees to moveable frame hives within a specified time; and, in default of such transfer, the inspector may destroy or order the destruction of such box hives and the bees dwelling therein, or may himself cause such bees to be so transferred.

THE CENTRAL CANADA VETERINARY ASSOCIATION

THE 14th annual meeting of the Central Canada Veterinary Association was held at Ottawa, Ontario, on January 18, 1917. The executive for the ensuing year is as follows: Honourary President, Dr. F. Torrance, Ottawa; president, Dr. Geo. Hilton, Ottawa; vice-president, Dr. S. L. O'Hara, Shawville;

secretary-treasurer, Dr. A. B. Wickware, Ottawa; councillors, Drs. H. D. Sparks, Ottawa; A. E. James, Ottawa; C. H. Higgins, Ottawa; R. Barnes, Ottawa; J. B. Hollingsworth, Ottawa; Lieut.-Colonel A. W. Harris, Ottawa; R. T. O'Hara, Maxville; P. W. O'Hara, Manotick.

THE ONTARIO VEGETABLE GROWERS' ASSOCIATION

The annual meeting of the Ontario Vegetable Growers' Association was held in Toronto during the week beginning February 5th; the officers appointed for 1917 were: President, J. J. Davis, London,

R. R. 7; 1st vice-president, E. K. Purdy, Kingston; 2nd vice-president, Maurice May, Tecumseh; secretary-treasurer, J. Lockie Wilson, Toronto.

THE ONTARIO ASSOCIATION OF FAIRS AND EXHIBITIONS

The officers for 1917 are as follows:—

President, Wm. Scarf, Durham; 1st vice-president, L. J. C. Bull, Brampton; 2nd vice-president, W. J. Connelly, Cobden; secretary, J. Lockie Wilson, Toronto; treasurer, Alex. McFarlane, Otterville; auditor, R. Agnew, Toronto.

Directors: District 1, J. C. Stuart, Osgoode Station; District 2, J. S. Sibbitt, Kingston; District 3, W. J. Barber, Ross-

more; District 4, E. H. Purdy, Port Perry; District 5, R. B. Henry, Orangeville; District 6, J. E. Peart, Hamilton; District 7, R. E. Cowan, Galt, R. R. 3; District 8, S. J. Monteith, Stratford; District 9, F. W. Johnston, Walkerville; District 10, Jno. McDermid, Lucknow, R. R. 6; District 11, W. J. Hamilton, Raymond; District 12, E. F. Stephenson, N. Liskeard, and Wm. Marshall, Sault Ste. Marie.

THE ONTARIO PLOUGHMEN'S ASSOCIATION

The officers and directors for 1917 are as follows:—

President, L. W. Smith, Millbrook; 1st vice-president, W. C. Barrie, Galt; 2nd vice-president, J. H. Garbutt, Peterboro; secretary, J. Lockie Wilson, Toronto; treasurer, T. A. Paterson, Agincourt.

Directors: W. C. Barrie, Galt; A.

Shantz, Preston; A. E. Wilson, Perrytown; Jas. McLean, Richmond Hill; W. G. Clark, Hagersville; T. G. Legge, Temperanceville; J. H. Willmott, Milton; J. H. Garbutt, Peterboro; Wm. Doherty, Eglinton; Wm. Dickieson, Rockwood; Frank Weir, Agincourt; A. B. Rose, Cainsville; L. W. Smith, Millbrook; T. G. Saigeon, Maple.

THE MANITOBA LIVE STOCK ASSOCIATIONS

THE officers elected for the Live Stock Associations of Manitoba at the conventions held at Brandon, January 8th, 9th, and 10th, are as follows:

MANITOBA HORSE BREEDERS' ASSOCIATION

President, John Scharff, Hartney; vice-president, Freeman Rice, Binscarth; directors, W. McKirdy, Napinka; J. G. Washington, Ninga; J. Wishart, Portage la Prairie; A. C. McPhail, Brandon.

MANITOBA CATTLE BREEDERS' ASSOCIATION

President, Walter Cummings, Winnipeg; vice-president, J. D. McGregor, Brandon; directors, J. R. Hume, Souris; John Barron,

Carberry; John Rankin, Oakner; Jas. Turner, Carrol.

MANITOBA SHEEP BREEDERS' ASSOCIATION

President, Geo. Gordon, Oak Lake; vice-president, Thos. Jasper, Harding; directors, W. H. Sanderson, Holland; J. R. Hume, Souris; A. J. Mackay, Macdonald; A. D. Gamley, Griswold.

MANITOBA SWINE BREEDERS' ASSOCIATION

President, Andrew Graham, Pomeroy; vice-president, John Strachan, Pope; directors: A. C. McPhail, Brandon; F. H. Wieneke, Stony Mountain; J. H. Dalglish, Grand View; J. R. Hume, Souris.

The secretary of all these associations is Geo. H. Greig, Winnipeg.

THE ALBERTA ANGUS BREEDERS' ASSOCIATION

The officers elected for the newly organized Angus Breeders' Association in the province of Alberta are: Hon. President, Dean Howes, College of Agriculture, University of Alberta; president, G. H.

Hutton, Lacombe; vice-president, J. H. Reid, Innisfree; 2nd vice-president, Chas. Ellet, Sandy Lake; secretary, F. R. Cathro, Calgary.

THE UNITED FARMERS' WOOL GROWERS ASSOCIATION

The United Farmers Wool Growers' Association of Alberta was organized on January 27th at a meeting which was attended by representatives of eight different sheep breeders' associations. The

officers for this new organization are: President, E. L. Richardson, Calgary; vice-president, W. J. Stark, Edmonton; secretary-treasurer, J. G. Herrington, Maple Creek.

THE BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION

THE 11th annual convention of the above association was held in the city of Nanaimo on January 25th and 26th, 1917. The total membership of the association for 1916 was 224, which was an increase of 26 per cent more than in 1915. All of the directors and about 95 per cent of the members are actual dairy farmers, the balance being creamery men and others closely connected with the industry. During the convention, addresses were delivered by Professor P. A. Boving, of the University of British Columbia, on "Succulent foods", with special reference to corn and roots; and "The Importance of a Right Start in Seed Growing — some Breeding Problems"; by Prof. J. A. McLean, of the University of British Columbia, on "Some Essentials of Dairy Cattle Feeding"; by Dr. S. F. Tolmie of the Dominion Live Stock Branch, on "Contagious Abortion", while Mr. Geo. H. Barr, Chief of the Dairy Division, Ottawa, delivered addresses on the "Care of Milk and Cream", and "The Importance of Cow-Testing". Mr. W. E. Scott, Deputy Minister of Agriculture, urged upon dairymen to increase production during the coming year to meet the Empire's needs.

RESOLUTIONS

Among the important resolutions passed were the following:

Resolved that in the opinion of this convention the suspension of the compulsory testing of cattle for tuberculosis is false economy and that the Honourable the Minister of Agriculture be urged to recommence the systematic testing of the dairy herds of the province at the earliest possible moment.

Resolved that the B. C. Dairymen's Association request the Dominion Railway Commission to grant to the province of British Columbia the same express rates on cream shipments as are now in effect in the province of Alberta, with a published tariff for a distance of 200 miles.

OFFICERS FOR 1917

The officers for the ensuing year are: Hon. President, A. C. Wells, Sardis, B.C.; president, S. H. Shannon, Cloverdale, B.C.; vice-president, P. H. Moore, B.S.A., Alderley Farm, Royal Oak, V.I., B.C.; acting-secretary treasurer, T. A. F. Wiancko, Provincial Dairy Instructor, Department of Agriculture, Victoria; directors, Lower mainland — J. M. Steves, Steveston; J. W. Berry, Langley Prairie; S. P. Chaplin, Agassiz; Islands — G. S. Harris, Moresby Isle; N. N. Grimmer, Pender Island; R. U. Herford, Courtenay; Upper country — M. Heron, Kelowna; A. W. Hunter, Armstrong; E. Jamieson, Kock Siding, Kootenay.

THE WESTERN CANADA FAIRS ASSOCIATION

The annual meeting of the Western Canada Fairs Association was held in Brandon on January 23rd and 24th, 1917. Representatives of the Calgary, Edmonton, Regina, Saskatoon, Brandon, Red Deer, North Battleford, Prince Albert, Weyburn, Yorkton and New Westminster fairs were in attendance.

At this convention, the following addresses were delivered: "The Functions of the Present-day Agricultural Exhibition," by Miss E. Cora Hind, Winnipeg;

"What Constitutes a Comprehensive Report of an Agricultural Exhibition," by W. I. Smale, Manager of the Brandon Exhibition; "Passes and the Control of Them," by E. L. Richardson, Manager of the Calgary Exhibition; "Farm Boys' Camps," by D. T. Elderkin, Manager of the Regina Exhibition.

The following officers were elected for 1917: President, W. I. Smale, Brandon; vice-president, J. O. Hettle, Saskatoon; secretary-treasurer, W. J. Stark, Edmonton.

NATIONAL LIVE STOCK WEEK.

A spirit of optimism prevailed at all the annual breeders' meetings held this year at Toronto from February 5th to 10th. With hardly an exception the associations reported progress in membership, registrations and finances. Each one also appeared to be possessed of the importance and demands of the world of to-day. Canada's duty and Canada's opportunity at this momentous period were fully recognized. What can be said in the way of success of the meetings in Toronto can also be said of the annual gathering of the Ayrshire Breeders' Association, which this year was held in Montreal. Revisions of the constitution were made in several instances, notably in the case of the Clydesdale, Shorthorn and Holstein-Friesian associations. In the last two cases the system of representation on the directorate according to membership by provinces was adopted.

Following is a list of the principal officers elected by each of the associations:

RECORD ASSOCIATIONS

CLYDESDALE HORSE ASSOCIATION OF CANADA

President, Wm. Graham, Claremont, Ont.; vice-president, James A. Torrance, Markham, Ont.; secretary, J. W. Wheaton, Toronto, Ont.; representatives on National Records Board, Jno. A. Boag, Queensville, Ont.; Wm. Graham, Claremont, Ont.; Robert Ness, Howick, Que.; Wm. Smith, Columbus, Ont.; Peter Christie, Manchester, Ont.; Fred Richardson, Columbus, Ont.

CANADIAN SHIRE HORSE ASSOCIATION

President, Amos Agar, Nashville, Ont.; vice-president, Jos. Bovaird, Brampton, Ont.; secretary-treasurer, G. de W. Green, Toronto, Ont.; representatives on National Records Board, Amos Agar, Nashville, Ont.; Jno. Gardhouse, Weston, Ont.

CANADIAN HACKNEY HORSE SOCIETY

Hon. president, Hon. R. Beith, Bowmanville; president, H. G. Boag, Barrie; vice-president, Robt. Graham, Toronto; sec.-treas., H. M. Robinson; representatives on National Records Board, Dr. E. Watson, Hudson Heights, Que.; H. M. Robinson, Toronto, Ont.

CANADIAN THOROUGHBRED HORSE SOCIETY

President, Col. Wm. Hendrie, Hamilton, Ont.; vice-president, J. J. Dixon, Toronto, Ont.; 2nd vice-president, A. E. Dymont, Toronto, Ont.; Secretary, T. J. Macabe, Toronto, Ont.; representatives on National Records Board, T. A. Crow, Toronto, Ont.; T. J. Macabe, Toronto, Ont.

CANADIAN STANDARD BRED HORSE SOCIETY

Hon. president, W. J. Cowan; president, George S. McCall; vice-president, Sam

McBride; secretary-treasurer, John W. Brant, Ottawa; representatives on National Records Board, T. A. Graham, Claremont, Ont.; T. H. Hassard, Markham Ont.

CANADIAN PONY SOCIETY

Hon. president, Judge McGillivray, Whitby, Ont.; president, W. J. Langton, Toronto, Ont.; vice-president, J. M. Gardhouse, Weston, Ont.; 2nd vice-president, E. Watson, Hudson Heights, Que.; Sec.-treas., G. de W. Green, Toronto, Ont.; representatives on National Records Board, W. J. Langton, Toronto, Ont.; H. M. Robinson, Toronto, Ont.

CANADIAN FRENCH COACH HORSE BREEDERS' ASSOCIATION

President, G. E. Goddard, Cochrane, Alta.; Sec.-treas., E. L. Richardson, Victoria Park, Calgary, Alta.; representatives on the National Records Board, G. E. Goddard, Cochrane, Alta.; W. B. Throne, Aldersyde, Alta.

CANADIAN TROTTING AND PACING HORSE ASSOCIATION

President, O. B. Sheppard, Toronto; vice-president, Geo. McCall, St. Thomas; secretary-treasurer, W. A. McCullough, Toronto.

DOMINION SHORTHORN BREEDERS' ASSOCIATION

President, W. A. Dryden, Brooklin, Ont.; 1st. vice-president J. F. Mitchell, Burlington, Ont.; 2nd vice-president, J. G. Barron, Carberry, Man.; secretary-treasurer, H. M. Pettit, Freeman, Ont.; registrar, R. G. T. Hitchman, Ottawa, Ont.; executive committee, W. A. Dryden, chairman, J. F. Mitchell, vice, J. A. Watt, Elora, Ont., Harry Smith, Hay, Ont., and J. M. Gardhouse, Weston, Ont.; representatives on the National Records Board, W. A. Dryden, Robert Miller, J. M. Gardhouse, Harry Smith, J. A. Watt, Peter White, K.C., Toronto.

CANADIAN AYRSHIRE BREEDERS' ASSOCIATION

Hon. president, John Bright, Ottawa, Ont.; president, W. W. Ballantyne, Stratford, Ont.; vice-president, L. J. Tarte, Montreal; secretary-treasurer, W. F. Stephen, Huntingdon, Que.; registrar, A. R. Dawson, Ottawa, Ont.; vice-presidents, Ontario—W. H. McNish, Lyn, Ont.; Quebec—Frank Byrne, Quebec, Que.; Manitoba—Wm. Braid, Oak River, Man.; Saskatchewan—F. H. O. Harrison, Pense, Sask.; Alberta—Rowland Ness, De Winton, Alta.; British Columbia—S. H. Shannon, Cloverdale, B.C.; Prince Edward Island—James Easton, Charlottetown, P.

E.I.; Nova Scotia—Prescott Blanchard, Truro, N.S.; New Brunswick, —G. C. P. McIntyre, Sussex, N.B.; representatives on the National Records Board, W. W. Ballantyne, John McKee, W. F. Stephen and H. C. Hamill.

THE HOLSTEIN-FRIESIAN ASSOCIATION

President, John W. Richardson, Caledonia, Ont.; 1st vice-president, Norman Michener, Red Deer, Alta.; 2nd vice-president, Neil Sangster, Ormstown, Que.; 3rd vice-president, Dr. S. F. Tolmie, Victoria, B.C.; 4th vice-president, G. A. Brethen, Norwood, Ont.; secretary-treasurer, W. A. Clemons, St. George, Ont.

CANADIAN HEREFORD BREEDERS' ASSOCIATION

President, W. H. Hunter, Orangeville; vice-president, L. O. Clifford, Oshawa; secretary-treasurer, H. D. Smith, Ancaster. representatives on the National Records Board, W. H. Hunter, Orangeville, Ont.; H. D. Smith, R.R. No. 1, Ancaster, Ont.

CANADIAN JERSEY CATTLE CLUB

President, John Pringle, Bank of Toronto, London, Ont.; vice-president, Duncan O. Bell, Brampton, Ont.; 2nd vice-president, H. A. Dolson, Norval Station; secretary-treasurer, Bartley H. Bull, Brampton, Ont.; representatives on the National Records Board, Bartley H. Bull, Brampton, Ont.; R. R. Fleming, Pickering, Ont.

CANADIAN GUERNSEY BREEDERS' ASSOCIATION

Hon. President, Hon. Sydney Fisher, Ottawa; president, T. D. Bates, Brookfield, N.S.; vice-president, Hugh Dickson, Central Onslow, N.S.; secretary-treasurer, Howard W. Corning, Chegoggin, N.S.; representatives on the National Records Board, T. D. Bates, Brookfield, N.S.; Howard W. Corning, Chegoggin, N.S.

CANADIAN BROWN SWISS ASSOCIATION

President, C. E. Standish, Ayer's Cliff, Que.; vice-president, W. A. Jolley, Waterloo, Que.; secretary-treasurer, Ralph H. Libby, Stanstead, Que.; representatives on the National Records Board, Ralph Ballagh, Guelph, Ont.; Ralph H. Libby, Stanstead, Que.

CANADIAN SHEEP BREEDERS' ASSOCIATION

President, Lt. Col. R. McEwen, London; vice-president, James Bryson, Brysonville, Que.; executive committee, W. A. Dryden, Brooklin; J. D. Brien, Ridgetown; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

CANADIAN SWINE BREEDERS' ASSOCIATION

President, P. J. McEwen, Wyoming, Ont.; vice-president, G. H. Hutton, Lacombe, Alta.; executive committee, J. I. Flatt, R.R. No. 2, Hamilton, J. E. Brethour,

Burford; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

THE CANADIAN KENNEL CLUB

President, Joseph Russell, M.L.A.; 1st vice-president, Arthur Atkinson; 2nd vice-president, W. M. Coates; provincial vice-presidents—Ontario, W. T. Marlatt; British Columbia—J. W. Creighton; Quebec—W. R. Aitkin Saskatchewan—Norman MacKenzie; Alberta—Dr. J. C. Reid; Maritime Provinces—W. W. Laskey; Manitoba—F. E. Trautman; Directors for the provinces—British Columbia, J. J. Jackson and Geo. H. Galvin; Saskatchewan, H. F. Morren and B. Wellbanks; Alberta, W. C. Burns and E. N. Barker; Manitoba, T. McKenzie and J. T. McCulley.

LIVE STOCK ASSOCIATIONS

ONTARIO HORSE BREEDERS' ASSOCIATION

President, Wm. Smith, Columbus, Ont.; vice-president, John A. Boag, Queensville; executive committee, Jas. Torrance, Markham; Wm. Graham, Claremont; John Gardhouse, Weston; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

DOMINION CATTLE BREEDERS' ASSOCIATION

President, or general director, John Gardhouse, Weston; representative from O.A.C., Prof. G. E. Day, Guelph; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

ONTARIO SHEEP BREEDERS' ASSOCIATION

President, James Douglas, Caledonia; vice-president, Geo. L. Telfer, Paris; executive committee, J. D. Brien, Ridgetown, J. W. Springstead, Abingdon; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

ONTARIO SWINE BREEDERS' ASSOCIATION

President, John I. Flatt, Hamilton; vice-president, Wm. Jones, Mt. Elgin; executive committee, H. A. Dolson, Cheltenham, Geo. Douglas, Mitchell; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

ONTARIO BERKSHIRE BREEDERS' ASSOCIATION

President, Frank Tesdale, Concord; vice-president, H. B. Jeffs, Bondhead; executive committee, W. W. Brownridge, Georgetown, Adam Thomson, Shakespeare; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

ONTARIO LARGE YORKSHIRE BREEDERS' SOCIETY

President, J. C. Stuart, Osgoode; vice-president, R. Garbutt, Belleville; executive committee, Wm. Jones, Mt. Elgin; J. E. Brethour, Burford; secretary-treasurer, R. W. Wade, Parliament Buildings, Toronto.

CANADIAN NATIONAL LIVE STOCK RECORDS

The following table gives the number of pedigrees and transfers, recorded by the Canadian National Live Stock Records' Board, of different breeds and classes of

horses, cattle, sheep and swine for the five years, 1912 to 1916, inclusive, and of Brown Swiss cattle and dogs for 1915 and 1916:—

ASSOCIATION	Pedigrees Recorded					Transfers Recorded				
	1912	1913	1914	1915	1916	1912	1913	1914	1915	1916
Shorthorn	6681	9173	10186	11135	14333	2763	3647	5813	5063	6987
Ayrshire	3111	3629	3496	3682	4000	1487	1418	1364	1407	1976
Hereford	1707	1820	2543	2147	3207	301	634	869	769	1087
Swine	6802	11509	14441	9718	13594	744	1231	1916	1507	3493
Clydesdale	4065	3678	2900	2555	3132	2859	3616	2773	2255	3266
Hackney	144	167	101	128	94	120	162	129	142	132
Shire	190	274	135	93	121	100	149	93	79	107
Thoroughbred	134	313	194	219	151	37	70	69	59	91
Sheep	3981	3934	4826	6019	7958	688	645	1372	1376	2509
Aberdeen Angus	946	1010	1541	1255	1431	334	652	761	797	1103
Galloway	72	23	91	63	30	24	6	7	22	45
Jersey	850	1135	1215	1065	1308	321	675	732	887	1014
Red Polled	268	459	102	80	477	29	24	37	45	52
Guernsey	206	87	154	230	146	39	48	35	39	88
Canadian Cattle	323	341	338	319	258	126	86	117	124	141
Canadian Horses	383	96	53	85	64	28	24	15	51	30
Pony	78	329	228	67	69	43	15	25	31	32
Belgian	142	106	132	76	131	81	92	83	96	94
Percheron	1580	1560	962	825	1323	313	556	486	493	642
Suffolk	51	86	31	35	28	6	18	29	13	32
French Coach	22	6	19	10	7		8	5	14	10
Standard Bred	358	560	361	319	382	17	93	164	157	192
Brown Swiss				432	270				4	23
Dogs				877	1542				183	1224
Totals	32094	40295	44049	41434	54066	10460	13869	16894	15613	24370

MEMBERSHIP OF LIVE STOCK ASSOCIATIONS

The following table shows the member-

ship of the different associations represented on the National Live Stock Records' Board in 1916:—

	Ont.	Man.	Sask.	Alta.	B.C.	Que.	N.B.	N.S.	P.E.I.	U.S.	G.B.	Total
Canadian Swine Breeders' Association	304	101	211	205	30	279	16	17	10	3		1,176
Canadian Sheep Breeders' Association	268	31	42	60	12	294	12	19	17	6		761
Dominton Shorthorn Breeders' Association	1,491	340	253	270	17	83	23	43	8	18	4	2,542
Canadian Ayrshire Breeders' Association	394	36	34	76	26	659	41	56	29	14		1,365
Canadian Hereford Breeders' Association	150	58	67	104	3	4		4	1	12		403
Canadian Jersey Cattle Club	191	18	22	17	51	43	17	19	5	1	1	385
North American Galloway Association	8	8	3	9								28
Canadian Aberdeen Angus Association	120	51	51	70	3	3			4	2		304
Canadian Guernsey Breeders' Association	3	1			8	7	7	36	3			65
French Canadian Cattle Breeders' Association.	2	1				166	2			1		172
Canadian Red Polled Association		16	11	9	10			1				47
Canadian Brown Swiss Association	1					6		1				8
Clydesdale Horse Association of Canada	1,412	381	330	178	38	74	10	13	15	9	3	2,463
Canadian Shire Horse Association	40	11	12	27	4	2				1	1	99
Canadian Hackney Horse Society	96	9	13	21	16	15	1	2	1	7	1	182
French Canadian Horse Breeders' Association	1	1				168	1			1		172
Canadian Percheron Horse Breeders' Association	78	45	109	121	5	13	3	1		6		381
Canadian Belgian Draft Horse Breeders' Association	2	6	30	18	1	22				1		80
Canadian Standard Bred Horse Society	97	17	37	36	13	17	2	2	3	2		226
Canadian Thoroughbred Horse Society	90	6	8	29	9	14						156
Canadian Pony Society	40	3	5	6	3	4						61
Canadian Suffolk Horse Society	1	1	4	14								20
Canadian French Coach Horse Breeders' Association			4	8								12
Canadian Kennel Club	465	70	41	44	119	89	17	6	2	22	1	876
	5, 54	1,211	1,287	1,322	368	1,962	153	220	108	92	7	11,984

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS

Gopher Destruction, compiled by J. H. Grisdale, B.Agr., Director, Dominion Experimental Farms, is Bulletin No. 31 of the second series, Experimental Farm bulletins.

The gopher pest is one of the greatest that the Western Provinces have to contend with. The present bulletin compiled by Director J. H. Grisdale, points out the damage caused by gophers and the consequent need for effective efforts directed towards their control. The methods of control or extermination recommended and described are poisoning, shooting, trapping, drowning and suffocating, with particular emphasis laid on poisoning as the most effective and rapid means of gopher control.

Seasonable Hints for March, April, May, June. While urging that every possible effort be put forth toward greater production, the Director of the Dominion Experimental Farms in this number places special emphasis upon the bright future that is before the live stock man. While prices for grain and forage crops may decrease somewhat following the close of the war, prices for live stock are almost certain, he says, to remain high for many years. Valuable timely suggestions are made by the chiefs or assistant chiefs at the Central Experimental Farm on all branches of field husbandry, forage plants, cereals, horticulture, live stock, poultry, bees, tobacco, soil fertility and fertilizers and botany. The name of any persons in Canada wishing for SEASONABLE HINTS will be entered on the mailing list on application free to the Publications Branch, Department of Agriculture, Ottawa. A list of the farm papers of each province with address, rate of subscription and periods of publication is given on the back page.

THE LIVE STOCK BRANCH

Wool Price Calculator, Pamphlet No. 13, prepared by T. Reg. Arkell, and issued by the Sheep and Goat Division of The Live Stock Branch.

This little pamphlet, as its title indicates, presents a convenient medium for rapid calculation of the price of wool, ranging in price per pound from 10 to 75 cents. In addition to this, there is included, complete directions for the use of the calculator, directions for caring for sheep in order to produce a good quality and condition of wool, directions for preparing and packing wool, a complete classification of Canadian wools and a glossary of wool terms.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

ONTARIO.

"Hints to Settlers in Northern Ontario", by W. G. Nixon, B.S.A., District Representative, New Liskeard, and R. H. Clemens, B.S.A., Superintendent, Demonstration Farm, Monteith, is Bulletin No. 244 of the Ontario Department of Agriculture. As stated in the introduction, the object of the writers in preparing this bulletin, "is to furnish the settlers of Northern Ontario, with suggestions, facts and figures which are available, that will help them to better understand how to meet and overcome some of the problems peculiar to the country." The bulletin is very ably written and suitably illustrated, outlining the settlement regulations, and giving many valuable hints with regard to the work necessary in preparing the land for cropping purposes.

"Food Values", by R. Harcourt, Professor of Chemistry, Ontario Agricultural College, constitutes Bulletin 245 of the Ontario Department of Agriculture. This bulletin of some 14 pages, which is indeed timely, points out the relative value as well as the actual value of the foods in common use in the average home.

Professor Harcourt in this bulletin, gives in detail, the most valuable constituents in our foods, from the study of which, the values mentioned have been arrived at. In addition to tables giving this information, there are included, suggestions with regard to intelligent buying of foods, fruit economy, vegetable economy, milk economy, fat economy and a few general recommendations, which, if followed, would help to solve the high cost of living problem.

MANITOBA.

Report on crops, live stock, etc., issued by the Department of Agriculture and Immigration, is Crop Bulletin No. 94. This bulletin states that the season of 1916 will be recorded in the agricultural annals of Manitoba as the great wheat rust year. The province having suffered very severely from black rust. The bulletin gives details with regard to all of the field crops grown, live stock, wool handled, co-operative dairying, poultry keeping, fruits and vegetables, and the honey crop, and extensive statistical tables giving the average yields of all crops in comparison with those of 1915, as well as the number of all live stock in the province.

Boys' and Girls' Clubs by S. T. Newton is Extension Bulletin, No. 10 and No. 1 of Volume II of the Manitoba Farmers' Library. This bulletin states that boys'

and girls' clubs have been in operation in Manitoba for four years, and at the present time the membership has almost reached the 13,000 mark. Corresponding to its growth in numbers the work undertaken has greatly increased. This bulletin, therefore, is intended as a guide to the clubs already organized and to new clubs likely to be organized. Within its pages, there are contained complete directions relative to the organization of a club, an outline of 12 contests to be conducted during 1917, a sports programme, a suggested prize list and much valuable information, relative to special contests and the general work of boys' and girls' clubs.

The report of the Manitoba Department of Education for the year ending June 30, 1916, is a well arranged and illustrated report of 225 pages. It is worthy of note that the frontispiece is a large photograph of the Superintendent of Education, now Major Charles K. Newcombe, B.A. The report deals with the various phases of education throughout the province.

In the report of the Deputy Minister, R. Fletcher, the following statement with regard to the consolidation of schools is made: "In the consolidated schools, there is more adequate supervision of the teaching work and better educational results." "This type of school is essentially a country school in the country and for the country." So successful has consolidation been, there are now 72 consolidations in operation. Attention is also paid to the school home and community, to the school as a social centre and young people's organizations; these include school fairs and field days, the work of boys' and girls' clubs, boy scouts and cadet organizations.

Manual of Industrial Drawing for use in connection with high and consolidated schools, boys' and girls' clubs and correspondence courses by S. T. Newton, Superintendent of the Extension Service of the Manitoba Agricultural College, and R. B. Vaughan, Head of the Department of Industrial Drawing, Kelvin Technical High School, Winnipeg.

This constitutes Bulletin No. 22 of the Extension Service, Manitoba Agricultural College, and is prepared especially to meet the needs of a large number of study clubs, which have been organized in connection with the boys' and girls' agriculture clubs.

As the subject of the bulletin indicates, it is a manual to be used in the study of mechanical drawing and gives information regarding the equipment necessary and the methods used in making working drawings. The work covered in the bulletin corresponds with that taken in the first year in the Winnipeg Technical High Schools.

BRITISH COLUMBIA

Farmers' Institutes Report. The British Columbia Department of Agriculture, has recently published the 16th annual report of the Farmers' Institutes of British Columbia. This report is a well-illustrated book of 108 pages, dealing in particular, with the work of the institutes, but containing much valuable information with regard to agricultural practices in British Columbia.

The proceedings of the 17th annual convention of the central farmers' institute, held at Victoria on March 8th to 10th, 1916, forms an interesting and valuable part of this report.

Seed Growers' Directory (1916-17). This is the title of Circular Bulletin No. 12 issued by the Soil and Crop Division of the British Columbia Department of Agriculture and constitutes a new idea in seed development. Immediately after the provincial seed fairs held by the Department of Agriculture during the month of December, all exhibitors were communicated with and asked to send in to the Department the quantity of seed available for sale and the selling price of same. From the information thus gathered a complete list of exhibitors showing name, address, variety of grain, score obtained at the provincial fair, amount for sale and price asked, was compiled and published in this bulletin.

Instructions to Teachers and School Boards with Reference to School and Home Gardens, is Circular No. 4 (revised and enlarged) of the British Columbia Department of Education. The subject of school and home garden is dealt with in all its phases, the following features receiving careful consideration: school garden plans; areas of school gardens; experimental work for advanced classes; under the latter the following are outlined as suitable experiments: Experiments involving variety and condition of seed used; Prevention of disease experiments; Selection experiments; Experiments involving methods of seeding and cultivation; Fertilizing experiments; Home gardens, supplementary home projects in rural science, school fairs, groups of schools in competition, grants to school boards, care of school gardens during summer holidays also receive careful attention. The bulletin is concluded with the insertion of a planting table for vegetables and a planting table for annual flowers.

MISCELLANEOUS

Agricultural Schools in Quebec.—Mr. J. C. Chapais, for many years Assistant Dairy Commissioner for Canada, has written and published a booklet entitled "Notes historiques sur les écoles d'agriculture dans Quebec" (Historical Notes on the Agricultural Schools of Quebec). According to the author no less than ten agricultural schools have operated for a shorter

or longer period in Quebec and as many as six others were projected but not realized. The first agricultural school noted was located at St. Joachim. It was founded in 1670 and was carried on for 47 years. The school of l'Assomption closed in 1898 after a period of 31 years of useful life. The school of Compton ran for 10 years and others for shorter periods. The present school in Ste. Anne de la Pocatière

and The Oka Agricultural Institute have been in operation for 57 and 23 years, respectively. In the preparation of the work, Mr. Chapais was compelled to consult many records as well as individuals who could supply information not previously recorded. This review first appeared in *La Revue Canadienne* of Montreal in the issues for April, May and June, 1916.

NOTES

Agricultural Societies in Nova Scotia had, in 1916, a membership of 10,523, this being a gain of 208 members during the year.

It is estimated that there are in Manitoba about 450 bee-keepers, who have, in round numbers, 10,000 colonies of bees, yielding in 1916 approximately, 800,000 pounds of honey.

A study of six species of thrushes by the U. S. Biological Survey shows that the economic tendencies of these birds are in keeping with their other desirable qualities. They commit no depredations on crops, and destroy large numbers of insects.

In addressing the Alberta Dairymen's Convention at Calgary. Provincial Dairy Superintendent, C. Marker, stated that the total 1916 production of 15 creameries amounted to 8,400,000 pounds of butter and of 15 cheese factories, 680,000 pounds of cheese.

In school garden work conducted by the Manitoba Department of Education, careful attention has always been paid to the growing of vegetables. Encouragement has also been given to have flower gardens as part of the work to beautify the school surroundings, while the school garden proper has been confined to the growing of vegetables and grains.

Dr. C. A. Zavitz, Professor of Field Husbandry at the Ontario Agricultural College, in addressing the Fairs Convention at Toronto, stated that there was enough good seed grown in Ontario last year to meet the needs of the coming year. Dr. Zavitz urged, that the standing field crop competitions be made use of for the purpose of still further emphasizing the desirability of limiting production to a few of the best varieties.

"Dairying is more than a producing industry, it is a manufacturing industry as well. There are 999 cheese factories and 167 creameries in Ontario, and 86,686 patrons supply milk or cream to these. The output in creamery butter is 25,000,000 pounds a year and in cheese 125,000,000 pounds. The total value of this, plus home-made butter, the whole milk and ice cream trade, at present prices, is sixty to sixty-five million dollars a year."—Geo. A. Putnam, Toronto.

In certain schools in the state of Oregon a system has been adopted to encourage children to be thoughtful, helpful, sanitary, punctual and systematic in their home life. School marks are given for such homework as making fires, getting breakfast, washing dishes, feeding chickens, cows, or pigs, cleaning the horse, carrying coal or wood, bathing regularly, cleaning the teeth, going to bed at nine o'clock, etc. These duties are printed on a small card with a standard value for each duty. The parents certify on this card how much the child did each day. The marks the pupils thus earn are credited on their school record.

The Dundas County Live Stock judging team, selected and trained by District Representative E. P. Bradt, won the live stock judging championship of the province of Ontario at the Union Stock Yards, Toronto, on February 7th, when they defeated the team representing York county by 73 points, the totals being 1,960 and 1,887, respectively. The Dundas team won the Eastern counties competition at the Ottawa Winter Fair, and the York team the championship of the Western counties at the Guelph Winter Fair. A large silver cup was given by the Union Stock Yards Company as representative of the provincial championship. Each of these teams consisted of three members and the stock judged was dairy cattle, horses, sheep and swine.

There are at work in the United States twelve hundred and sixty County Agents corresponding with District Representatives in Canada. Appointment of these men has been greatly facilitated by the passage of the Smith Lever Act by Congress which corresponds in many ways with THE AGRICULTURAL INSTRUCTION ACT OF CANADA. Appropriations of federal and state moneys for the fiscal year 1916-17 for the support of County Agents in United States, amounts to \$3,100,000. The average cost of the County Agent according to the United States Department of Agriculture is \$3,000 per year.

J. Laughland, B.S.A., District Representative of the Ontario Department of Agriculture in Simcoe County, reports that a number of farmers in his county are becoming interested in the question of reforestation. Four acres of land adjoining a school have been donated for the purpose of reforestation. The township council assisted by closing up certain streets between the land to be planted and the school, and voted a sum of money to assist in planting the trees. Farmers in this school locality are also giving assistance in preparing the land for planting.

The closing exercises of the short courses in agriculture and domestic science held at Caledon, in Peel county, Ontario, conducted by District Representative W. J. Stark, were held on February 2nd, 1917. This concluded a four weeks' course in agriculture, which was attended by 47 men, and a two weeks' short course in domestic science, which was attended by 71 women and girls. During the course in agriculture, a special two-days' convention was also conducted, which was attended by over 250 farmers and stockmen. The closing exercises were featured by a lengthy programme, presented by the members of the classes.

The Honourable J. E. Caron, Minister of Agriculture for the province of Quebec, has issued a strong appeal to the people of the province, rural and urban, for still greater efforts in the matter of production in 1917. In this appeal, the Minister has pointed out the great need of the day and refers to the many ways in which production can be increased throughout the province. Greater use of vacant lots in towns and villages for kitchen gardening is urged, while the farming population are urged to increase the number of milk cows and other

live stock, to increase milk production by eliminating inferior cows through the milk test, to increase the number of sheep kept, to make greater use of the by-products of the dairy industry, to increase the number of crops grown so that the population may be self-sustaining. An appeal for frugality and economy is also made.

Short Courses in dairying were given by the Manitoba Agricultural College during the month of February. These courses, namely, home dairy course, factory cheese makers course, creamery butter makers course, began simultaneously on February 5th and extended over a period of three weeks, closing February 23rd.

In the home dairy course, emphasis was laid upon the selection and care of the cream separator, care of milk and cream, making, packing, printing and marketing of dairy butter, milk testing, etc.

In the cheese makers course particular emphasis was laid on cheese making, milk testing and general cheese factory management.

In the third course creamery management, care and running of cream separators, butter making, milk testing and the selection, feeding and bringing up of the dairy herd, were the subjects receiving special study.

During the past year the Manitoba Home Economics Societies have shown substantial growth. The total membership, one year ago, as shown by the 1915 annual report of the Manitoba Department of Agriculture, was 2,824. The report for 1916 shows 3,381 members. The total receipts one year ago were placed at \$8,368.62; this year at \$22,514.70. The total expenditures for 1915 were \$6,337.20; for 1916 these were \$21,233.50, with the handsome balance of \$2,774.10 on hand at the end of the year as compared with \$1,444.27 twelve months ago. During the year these societies, of which Manitoba now has 90, have done nobly for patriotic purposes, donating a total of \$14,984.05. While they receive considerable aid from the Government in the way of supplying speakers, they are largely dependent upon their own resources financially, the total Government grants for the year being only \$1,273.35, or a little more than five per cent of the total receipts for the year.

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Dusting Fruit Trees, Prof. L. Caesar O.A.C., Guelph, page 27.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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CONTENTS

	PAGE
Organization for Marketing	251
Homesteaders as Farm Hands.	252

PART I.

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
The Division of Economic Fibre Production:—	
Organization and Work, by G. G. Bramhill	253
The Division of Botany: -	
Apple Dusting in Nova Scotia, by Paul A. Murphy	254
Special Researches in Grain Rust	259
The Entomological, Branch: -	
Varying Hares of the Prairie Provinces, by Norman Criddle	260
The Health of Animals Branch:—	
Sheep Scab, by A. E. Moore	263
The Live Stock Branch:—	
Eastern Storage for Western Wool Clip, by John Bright	265
More Poultry and Eggs Needed, by W. A. Brown	266
The Late Daniel Drummond	267

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Increased Crop Production:--	
New Brunswick:	
School Competition in Crop Production, by R. P. Steeves	268
An Appeal for Greater Production, by R. P. Steeves	269
Nova Scotia, by M. Cumming	269
Ontario: -	
Increased Garden and Farm Production	270
Increased Production of Poultry	271
Home Gardening Campaign	271
Saskatchewan: -	
Production in the School Garden, by W. W. Thomson	272
Alberta: -	
Increased Vegetable Production, by Jas. C. Miller.	273
British Columbia: -	
Efforts for Greater Production, by Wm. E. Scott.	273
Organization for Marketing:--	
Nova Scotia, by M. Cumming	275
Quebec, by E. Belanger	276
Ontario, by F. C. Hart	280
Saskatchewan:	
Co-operative Poultry Marketing, by W. W. Thomson.	283
Alberta, by H. A. Craig.	285
Successful Incubation:—	
The Nova Scotia Agricultural College, by J. P. Landry.	288
Macdonald College, by M. A. Jull	291
The Ontario Agricultural College, by W. R. Graham	294
The Manitoba Agricultural College, by M. C. Herner	295
Saskatchewan, by R. K. Baker.	296
Alberta, by A. W. Foley.	298

Quebec:—	PAGE
Skimming Stations, by A. Dion.	300
Bacon Hog Breeding Competitions, by F. N. Savoie	301
Standing Crop Competitions, by F. N. Savoie.	303
Notes, by E. Belanger.	304
Ontario:—	
Land Settlement for Returned Soldiers.	306
Agricultural Development in New Ontario, by C. F. Bailey	307
Agricultural School and Demonstration Farm	307
The Government Establishes a Creamery	307
Demonstration Fields	308
Seeding Down Roadsides and Waste Areas.. . . .	308
A Plant Breeding Station	309
Mr. Reek returns to Ontario	309
The Comparative Sustenance Value of Certain Staple Foods, by R. Harcourt	309
Manitoba: —	
The Sliding Scale System of Prize Awarding, by S. T. Newton	311
Saskatchewan:—	
The Better Farming Trains	312
Co-operative Wool Marketing	313
Gopher Day	313
Alberta:—	
Professor of Animal Husbandry for the College of Agriculture	313

PART III RURAL SCIENCE

Prince Edward Island:—	
School and Community Improvement, by Miss Hazel Sterns	314
Nova Scotia:—	
The Women's Institutes, by Miss Jennie Fraser	315
Manitoba: -	
School and Home Gardening, by S. E. Lang	316

PART IV SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Agricultural Legislation:-	
The Stray Animals Acts	318
Protection of Sheep Against Dogs	320
Activities of Toronto Back-yard Garden Committees	321
Co-operative Marketing of Wool in Ontario	322
Advisory Board on Wild Life Protection.	322
Ottawa School Boys Make Bird Houses	323
Associations and Societies	324
New Publications	329
Notes.	331
Index to Periodical Literature	332

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ORGANIZATION FOR MARKETING

IN his book "Rural Denmark" Sir H. Rider Haggard says: "Whatever else may be doubtful or open to argument in connection with Danish agriculture one thing remains clear, namely, that it owes the greater part of such prosperity as it possesses to the working of the co-operative movement." On the same page he points out that in Great Britain co-operation for the sale of produce is still in its infancy. That was four years ago. Had Sir Rider been writing on co-operation to-day he might have made a similar statement in regard to Canada. The people of Canada, like the people of Great Britain, do not rush into far-reaching reforms even after they are convinced of the weaknesses of the old system. Of the people of Denmark more than ninety-five per cent were born in the country. It is easier for them than for a mixed population, widely scattered, to follow a new lead. Co-operation must wait for a strong popular sentiment. That sentiment is getting a hold in Canada and is being followed by organization, confidence and loyalty, all of which are necessary to a permanent success.

It is easier to organize the producers of a single crop than of many crops. The wheat raisers of the Prairie Provinces have found it comparatively easy to develop and maintain a strong marketing organization. Upwards of four thousand organized egg producers last year sold more than one million dozens of eggs and a large quantity of poultry for a net valuation considerably exceeding \$300,000. Twenty-six associations of sheep raisers disposed of almost a million and three-quarters pounds of wool at a valuation of more than half a million dollars. Fruit growers in several provinces sold their fruit co-operatively. In the west particularly live stock men are agitating for better marketing facilities. Those working towards this end, and indeed any who are endeavouring to solve the marketing problem will find helpful information in this number of THE AGRICULTURAL GAZETTE containing a symposium by responsible officers of the methods of organization for marketing existing in the several provinces.

HOMESTEADERS AS FARM HANDS

ON account of the scarcity of farm labourers coupled with the diminution of the land prepared for seed in the Western Provinces, the Governor-General in Council has made the following Order and Regulations under "The War Measures Act, 1914":

Notwithstanding anything contained in the Dominion Lands Act or the amendments thereto, during the remainder of the year 1917 the holders of homesteads, pre-emption or purchased homestead entries who are employed as farm labourers within the Dominion of Canada may be allowed the period of such employment as a like period of residence in connection with their respective entries, subject to the following conditions:—

1. The time of employment to be counted as residence duties must be subsequent to the actual date of entry in each case.

2. The provisions of this order shall not apply to unperfected proxy entries, nor to any case in which the entrant is engaged in any other employment than actual farm labour.

3. As soon as possible after the entrant commences work, it shall be his duty to forward to the Agent of Dominion Lands for the district in which the land is situated, sworn evidence satisfactory to the Minister of the Interior giving particulars of the land held under entry, the nature of the work performed, where performed, date of commencement, and probable duration.

4. Within thirty days after the term of employment has expired, and, in any case, not later than the 1st of February, 1918, the entrant shall file with the local Agent for the district sworn evidence satisfactory to the Minister of the Interior of the time actually spent on farm work.

5. In the event of the cancellation of any entry for the default in the performance of the conditions thereof, nothing in this Order shall be held to confer any right or claim upon the former holder of any such entry who, being engaged in farm labour in Canada as aforesaid, has failed, prior to the date of cancellation, to notify the Agent of Dominion Lands for the district of the fact of his being so engaged.

6. The entry of any person complying with the foregoing provisions shall not, during the period of his employment on farm labour, be liable to cancellation by reason of his failure to perform the cultivation required in connection with his entry.

7. Notwithstanding anything contained in the Dominion Lands Act or the amendments thereto, the cultivation required to earn patent in such cases may be performed in two years instead of three.

8. In any case in which the Minister of the Interior is not satisfied as to the *bona fides* of the case, he is authorized to withhold the benefits provided for by the foregoing.

The relationship of agriculture and its industries, not only to the economic life of the Province but also to the type of citizenship and the quality of social life is now being appreciated as never before. The economic re-adjustments of the past few years have impressed upon the towns and cities in a most effective way that they cannot live unto themselves alone, but are dependent upon what the country really produces for an enduring basis of prosperity. The effect of the war in bringing people back to first principles and abiding values will influence the trend of events and the aspiration of the people for generations to come. The producer and consumer are being brought into new and closer relationship. The importance of economy and efficiency in producing, and of thrift and intelligence in consuming, is more and more coming to assume its proper place in the consciousness of the people.—*Alberta Agricultural Education Bulletin.*

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF ECONOMIC FIBRE PRODUCTION

ORGANIZATION AND WORK

BY G. G. BRAMHILL, B.S.A., CHIEF

AT the last session of the Dominion Parliament the following resolution was passed with respect to the flax industry in Canada:

"That in the opinion of this house, taking into consideration the stability of the flax industry and the market value of the product, more attention might be given to promoting its cultivation in Canada; that the flax and linen industries should, both as to culture and manufacture, receive that aid and consideration from the Government which would enable it to assume the importance the natural resources of the country assure it. To this end, serious encouragement should be given to farmers by such means as the Government, after full investigation, deems best, to increase the production of flax throughout the Dominion."

Previous to this, acting under instructions from the Minister of Agriculture, J. H. Grisdale, Director of Dominion Experimental Farms, conducted an investigation of the flax fibre producing industry in the United States and Canada. The object of this investigation was to secure information available in Government Bureaux; to observe the status of the flax industry in Canada and the United States; to determine what action was necessary to encour-

age the flax industry in Canada; to locate men capable of taking part in a propaganda to increase flax production and to secure general information on the subject. Mr. Grisdale visited the fibre division of the U. S. Department of Agriculture, and the principal flax producing areas in the United States. He spent some time in the flax producing districts of Western Ontario and consulted with the leading flax men of that district. After giving the whole matter an exhaustive study the following resolutions were placed before the Minister of Agriculture:

"That a Division for fibre research work be established as part of the Experimental Farms Branch.

"That a young man with an agricultural training and an inclination toward the industry be employed to look into the whole question and make a thorough study of the practical side of the business by performing all the actual operations in a flax mill, until he could act as an expert in judging growing crops of flax for fibre, in harvesting, in retting, in scutching, in sorting and grading, in baling, in hackling and in judging fibre. This man when adjudged to have attained a sufficient degree of efficiency, should be placed at the head of the work with fibre.

"That a small but complete experimental flax mill be established on the

Central Farm at Ottawa for all the operations in connection with flax production.

"That exhaustive experimental work be carried on, as to varieties of flax and methods of cultivation, on the Dominion Experimental Farms and in various districts where flax is likely to be successful."

The report submitted by Mr. Grisdale was adopted by the Department of Agriculture as a working basis upon which to encourage and develop the fibre industry in Canada.

The experimental flax mill suggested in Mr. Grisdale's report is now being erected at the Experimental Farm at Ottawa. The mill is being equipped largely with the machinery at present in use in flax mills, but provision is being made for the installation of new machinery in order to determine the efficiency and economy of some of the newer inventions. The mill is provided with three tanks for water retting experiments, each having a different system of heating and water circulation. It is also provided with drying chambers in order to determine whether the costly system of field drying can be dispensed with. The mill is being equipped and every means provided for exhaustive experimental work in fibre production.

In addition to the mill experiments, field experimental work with both flax and hemp will be conducted on the Central Experimental Farm and on Branch Farms and in districts where fibre plant cultivation is likely

to be successful. These experiments will be conducted with a view to determining what areas in Canada are suitable to fibre production; the proper amount of seed to sow per acre; the right stage to sow and harvest fibre crops; the extent to which flax reduces the fertility of the soil and what fertilizers can be economically used with fibre plants. These are questions upon which there is very little accurate scientific data at present.

During the past season experimental plots of flax consisting of one acre each were grown in various parts of Canada. While no conclusions can be drawn until fibre tests are made, it would seem that excellent fibre can be produced in many different sections of Canada. The Maritime Provinces, Quebec, Ontario and British Columbia would seem to have great possibilities along this line. Investigational work is being carried on at present as to the possibility of utilizing western seed flax straw for such commercial purposes as upholstering tow, fibre board and paper manufacture. Some interesting developments are looked for along this line.

The Fibre Division would be glad to co-operate with provincial colleges and experimental farms along the line of conducting fibre tests of flax or hemp grown in the various provinces.

THE DIVISION OF BOTANY

APPLE DUSTING IN NOVA SCOTIA

EXPERIMENTS ON A NEW METHOD FOR THE CONTROL OF APPLE SCAB AND OTHER INSECT AND FUNGUS DISEASES OF THE APPLE

BY PAUL A. MURPHY, OFFICER IN CHARGE DOMINION PLANT PATHOLOGICAL LABORATORY, CHARLOTTETOWN, P.E.I.

THE remarkable success which has attended the efforts of the Plant Pathology Department of the Cornell Experiment Station in New York State to substitute a dry

dust for liquid sprays in the control of fungous and insect pests of apples made it desirable to test the method under Nova Scotia conditions, with a view to seeing if it could be utilized

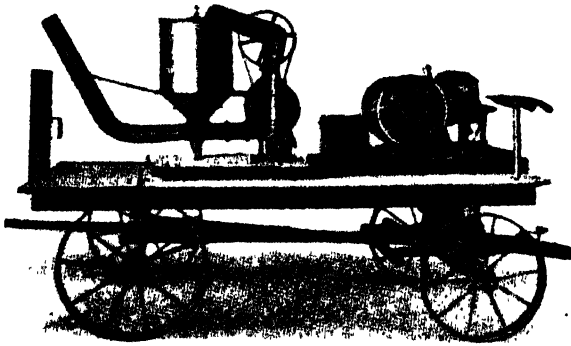
by the growers of the Annapolis Valley. Should it prove as adequate as it seemed to be in New York up to 1916, a great boon would be conferred on our orchardists, and a new era in apple protection opened comparable to the introduction of Bordeaux mixture or lime-sulphur. The substances used by the New York pathologists with such marked success were very finely ground sulphur and arsenate of lead in varying proportions, the applications being made with a special dusting apparatus. When these experiments were planned in the spring of 1916, it looked as though they had substituted for the ponderous spray rig the duster, with

of Starks, with fillers of Duchess, was placed at our disposal by Mr. Fred. Parker. The mechanism consists merely of a small fan running at a high speed, into the outlet of which the dust falls from hopper under the influence of gravity and a revolving agitator. The machine was operated by a one and a half horse power gasoline engine which was obtained locally, and the two were fitted together in one hour by unskilled labour. Incidental difficulties in getting a suitable team showed that the duster could be accommodated on a light or a heavy wagon, on a stone boat, or on almost anything around the farm capable

of motion. The fact that the experimenter lived a journey of a day and a half away from the orchard and that with a devotion no matter how great to the weather bulletins he could not always get to Berwick at the critical times, proved no apparent drawback. The dust was put on before and after wet periods, when the leaves were wet and when they were dry, and it proved much more elastic in this respect than liquid spray. The two

were always put on the same day with one exception, the result of which is seen in Table II.

In the principal experiment, carried out at Mr. Parker's orchard at Berwick, there were four principal plots, as shown in Table I. Plot No. 1 received four applications of an undiluted dust made up of 85 per cent sulphur and 15 per cent arsenate of lead, both ground especially fine. Plot No. 2 received four applications of a dust containing 50 per cent sulphur, 15 per cent arsenate of lead, and 35 per cent of an inert diluant, all especially finely ground. The sprayed plot, No. 3, was thoroughly covered four times with lime-sulphur, to which was added 5 lb. of arsenate of lead per 100 gallons of the spray.



THE TYPE OF DUSTER AND ENGINE USED
IN THE EXPERIMENT

about half the cost, less than one-third the weight, taking less than one-third the time, and capable of doing the same work better with one-third less help and much greater ease. Since that time the prospects for a general adoption of dusting in certain of the States are hardly as promising, but it is still very desirable to test it under Canadian conditions for the information of fruit growers.

A small dusting machine, the No. 5 model of the Dust Sprayer Mfg. Co., Kansas City, Mo., was purchased in the spring of 1916, the first of the kind to be introduced into the country, and shipped to Berwick, N.S., where a part of a young orchard

Strength 1.008 was used in the first three sprayings, and as this caused a certain amount of burning, 1.007 was used in the last. The spraying and dusting were done on the same day in every case, the dates being May 19 and May 31, June 15 and June 30. The set of fruit in this orchard was very light.

A feature of the work all through

the season was the splendid showing of the dusted foliage in comparison with the lime-sulphur plot and the check. One unacquainted with the experiment could have picked the dusted trees out of the whole orchard from the fact that their leaves were so free from stain, spray injury or spot.

TABLE I. PARKER ORCHARD, BERWICK, N.S.—VARIETY STARK

No. of Plot	Treatment of Plot	Materials Used	BLEMISHED FRUIT		APPLE SCAB		INSECT ATTACKS		Per cent Nos. 1 and 2
			No.	Per cent	No.	Per cent	No.	Per cent	
1	Dusted	Sulphur, 85 per cent and lead arsenate, 15 per cent	49	5.2	19	2.0	29	3.1	93.8
2	Dusted	Sulphur, 50 per cent and lead arsenate, 15 per cent	34	4.9	17	2.45	17	2.45	90.6
3	Sprayed	Lime-sulphur and lead arsenate	87	6.9	2	0.2	84	6.6	88.6
4	Check		303	28.3	149	13.9	153	14.3	66.4

From a consideration of Table I it will be seen that the proportion of blemished apples is slightly less in both dusted plots than in the sprayed plot, and very much less than in the check. The difference between the spray and the dust is well within the experimental error limit, and the same may be said for the figures in the last column showing the pack-out, the treated plots (sprayed and dusted) lying between 88.6 per cent and 93.8 per cent, with the check 66.4 per cent. No better demonstration could be expected of the value of spraying and of the fact that in a season like 1916 dusting apples with dry dust is at the least as effective as lime-sulphur spraying. While in the control of apple scab the dust was not as efficient as the spray, this was more than offset by its superior elimination of biting insects. This experience seems to be constant in all dusting experiments—the very complete control of biting insects and the slightly inferior protection against scab. It is partly explained in this work by the fact that the dusting outfit was too small

to reach the tops of the trees with the result that the fruit on the upper branches was more than three times as blemished as that on the lower, as determined by careful counts. The fruit on the sprayed trees was almost equally spotted above and below. Had the machine been larger the dusted fruit would have shown up even better.

The prospects for a set of fruit in the Parker orchard looked so poor about the end of May at the time of the second spraying, that we decided to undertake work elsewhere. An orchard of fully grown trees of mixed varieties, unsprayed until then, was placed at our disposal by Mrs. Tully, of Kentville, N.S., and we took over a small block composed of Ribstons, and Gravensteins. The spraying and dusting were done as described in the previous experiment, the only change being that the first spray was missed and the second, third and fourth only applied. Unfortunately the records for the Gravensteins could not be obtained, so the figures relating to the Ribstons alone are given in Table II.

TABLE II. TULLY ORCHARD, KENTVILLE, N.S.—VARIETY RIBSTON PIPPIN

No. of Plot	Treatment of	Materials Used	BLEMISHED FRUIT		APPLE SCAB		INSECT ATTACKS		Percent Nos. 1 and 2
			No.	Per cent	No.	Per cent	No.	Per cent	
1	Dusted	Sulphur, 85 per cent and lead arsenate, 15 per cent	97	2 1	23	0 5	53	1 2	
2	Dusted	Sulphur, 50 per cent and lead arsenate, 15 per cent							
3	Sprayed	Lime-sulphur and lead arsenate	206	5 5	42	1 1	158	4 2	
4	Check		188	16 0	28	2 4	157	13 4	
			840	19 1	180	4 1	651	14 8	

There were so many unblemished No. 3's that the figures for this column are not given owing to their misleading character.



USING THE DUSTER ON A STONE BOAT IN THE PARKER ORCHARD

In spite of the fact that all the trees were of a larger size, placing an undue task on the small dusting outfit, the dust comes out superior on all counts to lime-sulphur spraying, and very greatly superior to the check. It is probable that the comparatively poor showing of the spray is to be attributed to the fact that at the time for the third spray, June 10th, which proved the critical period for scab infection, the lime-sulphur was not applied until after a period of four

days continued rain, while the dust was applied during an intermission of the storm.

We may safely conclude from these experiments that in a year like 1916 sulphur dusting will control the fungous diseases and insect diseases of apples, as well as lime-sulphur spraying. Further experiments will be required before making a more general statement. It now remains to sum up the relative advantages and disadvantages of the two

methods. On the score of the capital invested and cost of upkeep the dry process comes out easily superior, a duster of the largest size costing at present prices about \$165 alone, or in the neighbourhood of \$300 with a three and a half horse power engine. Only a small part of the cost of the engine should be charged to the dusting account as it can, and probably will, be used much more for other work about the farm. On the question of the time taken in dusting we are not ourselves in a position to give accurate data, on account of the small size of the machine used, but from exhaustive trials in New

Against all this there must be set the failure of controlling sucking insects with a dry application, a difficulty at present insuperable where these pests are present, and an important one in parts of the Annapolis Valley. Further, and, lastly, must be added the somewhat higher cost of the dusting materials, a difference which is not always quite balanced by the saving in time and labour, if we take the New York figures, which are more trustworthy than ours. They give the average cost of dusting as from 24 cents to 39 cents per tree per season and the average cost of spraying



APPLE BLOSSOM TIME IN THE ANNAPOLIS VALLEY

York we learn that dusting is under average circumstances more than three times as quick as spraying, as well as requiring less help and less horse labour, one man and a boy to drive one horse in a light waggon taking the place of two men, with a team of horses driven by a boy. The final advantages in favour of dusting are that the light outfit can be used on ground which would not carry a sprayer, and above all that it is not necessary to give up the bright clear days to spraying, for the dust can be put on when the foliage is damp.

under the same conditions from 28 cents to 32 cents. When one takes into account the tremendous amount of time saved by dusting and the smaller amount of help needed these figures will not be a deterrent, especially to the larger grower who has only been prevented from doing as much spraying as he would have liked to do in the past by lack of time and lack of labour. To the smaller grower on the other hand the new method offers a very much smaller capital outlay, if a slightly higher yearly expense for materials, and it will probably be the solution of the

problem for the man with a few trees.

The greatest advantage of the dusting method is that it allows even the largest growers to cover the whole orchard at the critical times before rain-storms, an advantage so great that if sulphur dusting possessed no other it would still be valuable. Many of our fruit growers do not appreciate the importance of this point, the necessity to have the spray or dust on before the rainy periods come during which infection takes place, but it is a master key to the explanation of many of the disappointing results from spraying. For an illustration we have only to look at the poor showing of lime-sulphur in Table II. It was put on after a prolonged rain-storm, during which the principal infections took place, while the dust was put on two days previously. It is said that an orchard of 60 to 80 acres can be covered in two days with a good dusting outfit and it is generally possible to forecast rain-storms that period in advance.

While these experiments have proved a real success and hold out a hope of the applicability of sulphur

dusting to Eastern conditions, apple growers would be wise not to rush into it too quickly. Further experiments on a larger scale and extending over a larger variety of seasons will be necessary before the practice can be recommended more absolutely. It must be remembered that sulphur dusting with all its potential advantages is unsafe to use until it can be proved that it will control apple scab under all conditions, and in all seasons, in Nova Scotia. So far as we are concerned it is still in the experimental stage and growers would be wise not to place too much reliance on the results of experiments carried out under different climatic and other conditions. The Division of Botany is planning to carry out further experiments on an enlarged scale in the coming season and intends to carry them on until a definite conclusion is arrived at. In the meantime the average grower would probably be wise to leave the experimenting to them, although the larger growers who find it difficult to get all their trees covered at the critical time, or at any other time, might be repaid by giving it a trial.

SPECIAL RESEARCHES ON GRAIN RUST

THE seriousness of the epidemic of grain rust that occurred in certain localities of Western Canada last year, causing a loss estimated at \$100,000,000, has led the Honourable Martin Burrell, Minister of Agriculture, to provide for some special research work in connection with this disease of grain crops. As was announced in THE AGRICULTURAL GAZETTE for October last year, research laboratories are being established at Brandon, Manitoba, and Indian Head, Saskatchewan. A further step has now been taken by the Minister in the appointment of a scientist in the person of Mr. W. P. Fraser, M.A., who will carry on special investigations at these western field laboratories. Mr. Fraser leaves the assistant professorship of

biology at Macdonald College to undertake this new duty. He is a Canadian by birth, a bachelor of arts of Cornell University and a master of arts of Dalhousie University at Halifax. For a number of years he has carried on successful experiments with plant rusts, the results of which have established the life history of fourteen species previously unknown to science besides having confirmed the life history of many more and has added much to the general knowledge of plant rusts. In grain rusts he has made special researches which have not yet been published. Mr. Fraser in his new appointment becomes an officer of the Botanical Division of the Experimental Farms System.

THE ENTOMOLOGICAL BRANCH

VARYING HARES OF THE PRAIRIE PROVINCES

BY NORMAN CRIDDLE, DOMINION ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

THE Varying Hare or bush rabbit, as it is more frequently called, *Lepus americanus*, with its various geographical races has a range in Western Canada almost as extensive as the woodlands. Every bush of moderate size, provided it is not widely isolated, has harboured rabbits at one time or another; indeed it is doubtful whether there are any of reasonable dimensions that have escaped a visit at some period of their growth. Creek bottoms and river flats are particularly well adapted to the support of the rodents containing as they do, the maximum amount of food with an abundance of shelter. From such habitations these rabbits wander far-a-field at night, returning, as a rule, to their forms before sunrise next morning, though a few will roam to distant parts in which they remain. Willow thickets harbour them anywhere, so will the mixed woods or low underbrush made up of hazel, cherry, thorn, and aspen poplar. Evergreens alone seldom prove suitable habitations but when mixed with deciduous growth, as they generally are, they prove as suitable to the rabbits' requirements as any other. In fact, taken as a whole, this species is a prominent inhabitant of the entire Canadian zone.

The habits of bush rabbits are known, in a general way, to most people. There is some uncertainty, however, as to the number of litters produced yearly. We know that there is a very general one in June. Young have also been found in April and, at times, immature individuals in November. Whether this means that there are three litters is doubt-

ful but in any case there is no doubt that the animals increase very rapidly at times. It is hardly necessary to add that they have two distinct colour phases, grayish or grayish-brown in summer and white in winter. Varying Hares are nocturnal in habit, that is to say, they seldom begin to move before sunset and they retire to their shelters before sunrise next morning. As soon as the shades of evening appear these rabbits leave their hiding places and set forth in quest of food. In this search they generally frequent the more open glades. During summer grass patches and other herbaceous vegetation constitute the chief food. In winter the bark of small trees is most frequently partaken of, particularly after the ground is covered with snow. For a time during April and May these animals more or less forsake their usual nocturnal habits and may be seen running about in broad daylight. It is the only time of year at which they do so and even then they are more active at twilight.

ECONOMIC STATUS

This in brief is an outline of the habits of the bush rabbits. We will now attempt to summarise their economic status in relation to mankind. There are very few animals that are wholly good or wholly bad. We have a habit now-a-days, however, of weighing each in the balance of economy and condemning such as are found to be less than fifty per cent useful. With this end in view we will proceed to weigh the evidence so far as known to us, taking the bad deeds first and following with the good.

Probably the greatest crime that can be laid against bush rabbits is that they destroy countless numbers of young trees by gnawing and eating the bark so that the trees are either girdled or so badly wounded as to never thoroughly recover from the attack. It is not an uncommon sight to see acres of aspen poplars destroyed in this way after a severe winter. Larches also are denuded of their bark, while spruce and pine are generally stripped of their branches. The chief injury to larch and evergreens occurs, as a rule, in the vicinity of mixed woods. With larch the greatest damage is effected on the edges of bogs.

Probably no recent winter has presented such an example of rabbit destruction as that of 1915-16. This was unquestionably due to several causes. First to the abundance of the animals themselves and secondly to the abnormal weather conditions. There was an unusually heavy fall of snow and much wind, causing the snow to drift, to which may be added severe cold. It was thus impossible for the rabbits to procure food from the ground and they were obliged to subsist entirely upon bark during an abnormally long winter with disastrous results to young growth everywhere. Enormous numbers of aspen poplars were destroyed in Southern Manitoba and Saskatchewan and the infestation appears to have extended far northward. Practically all kinds of trees and shrubs were attacked, those suffering most being aspen poplar, larch, spruce, pine, birch, willow, oak, elms, thorn, pin cherry, hazel nut and others in lesser degree. Nor did the rabbits stop here; had they done so, possibly little would have been heard of their depredations. Their invasion of gardens, however, was another matter. In this last habit various shrubs suffered greatly. Plum, cherry and apple trees were frequently cut to the ground, in some instances quite old orchards being badly cut back. In the majority of instances the ap-

ples attacked were cross varieties or crabs, but in the Morden district of Manitoba many standard apple trees were ruined. Ornamental shrubs and nursery stock was also much cut back and at Estevan I saw thousands of cultivated willows eaten almost to the roots. Such a devastation fortunately does not occur every year; did it do so our forests would soon vanish.

The injury caused by bush rabbits is far less in summer than in winter. In the close vicinity of woodlands, gardens are frequently invaded and peas, cabbages, lettuce, etc., suffer much. Sweet peas and snapdragon are also eaten in flower gardens. In the fields oats prove especially attractive.

Bush rabbits cannot be said to be of any particular use to mankind in their habits and it is therefore in the use of their flesh and fur for food and clothing that their value lies. Their flesh is tender and palatable providing a cheap and excellent article of diet when the animals are killed at the right time of year, namely, between the first of October and January. Later their flesh becomes permeated with the flavour of the trees they feed upon, this being especially objectionable when the food consists of aspen poplar. Nor is their flesh particularly attractive during the summer months though it is not in any way unwholesome. It seems reasonable to infer that most of the objections to eating rabbit flesh has been due to the animal having been killed at the wrong time of year, or to having been shot through the intestines. With a little more care and knowledge on these subjects there is no reason why bush rabbits should not be used to a far greater extent for food than they are at present, nor why collecting them should not provide profitable employment by placing them on the market both for food and fur purposes. In the United States the numbers of wild rabbits of all kinds consumed for food amount to two or

three millions annually. The fur too is utilized as a substitute for various other skins and is moreover employed in the manufacture of felt hats.

These constitute the principal arguments for and against bush rabbits. It will be seen that at present the damage effected by these rodents outweighs the good, but that they offer possibilities in food and fur values which, if developed to the best advantage, might make them an asset of considerable economic importance.

THE CONTROL OF BUSH RABBITS

The control of bush rabbits may be divided into two heads: natural and artificial. The latter can only be adopted over restricted areas while we must depend upon the former for destroying them over those wide areas at present but sparsely inhabited by mankind.

The natural enemies of bush rabbits are many. First may be mentioned a very deadly disease which is apt to appear at any time and may be responsible for practically exterminating the rabbits in certain districts and this too, within a few weeks. This disease has erroneously been claimed to appear every seven years. As a matter of fact it may occur at any time when the animals become abnormally abundant, or may be absent for twenty years or more. Another agency of destruction consists of the larvæ of a tape-worm *Taenia* sp. which so weakens the rabbits that they fall an easy prey to carnivorous animals such as coyotes and foxes which constitute the alternate hosts of the parasite. Turning to the higher animals special mention must be made of coyotes especially in the more open prairie regions along river flats, etc., where rabbits certainly constitute the coyote's chief food. Lynxes are also chiefly rabbit feeders, while foxes too come in for a goodly share. The long-tailed weasel, *Longicauda*, and to a lesser degree the mink are its enemies. Three

birds are prominent in the destruction of rabbits. The Goshawk, which is also very injurious to grouse; both eagles are largely rabbit feeders and lastly there are the Great Horned owls. These owls have unfortunately been reduced much by man of late years, though there are no birds that take a heavier toll of bush rabbits. Preserve these birds and mammals and we should in time reduce rabbits very materially and by this means at least aid in conserving our forests.

Of the artificial remedies for the protection of gardens and local woods the following will be found useful:

1. In summer time gardens can be protected by means of poultry netting. This should be not less than two and a half feet high and it is necessary to see that it touches the ground and is sufficiently fastened down to prevent the rabbits forcing their way under it.

2. Rabbits are extremely fond of salt and can be destroyed by use of the following bait:

Strychnine powder	1 ounce
Salt	1½ pound
Water	2 pints
Sawdust	12 quarts

Mix the first three ingredients thoroughly and then pour on to the sawdust using extra water if necessary to wet all the sawdust. This can then be dried, or if required for immediate use, may be put out wet. Place in the vicinity of rabbit runs or in situations they are known to frequent. In winter it is advisable to tread the snow down first or place a piece of board beneath the mixture so that it can be found in case of fresh snow. Bran, shorts or earth may be used instead of sawdust or the poison may be poured directly upon the soil which the rabbits will readily eat for the salt in it. It is perhaps wise to add that strychnine is a deadly poison and a very painful one, and as live stock are also fond of salt it

should not in any case be placed where they can get at it.

3. Shooting. Rabbits may be killed in large numbers by shooting especially if organized hunts are undertaken. The best time for such hunts is just before the snow comes in autumn, when the rabbits

are turning white and so show up against the dark background, or in spring time when they are active during much of the day. Snares, traps, etc., are also valuable for catching rabbits but they require more attention and time.

THE HEALTH OF ANIMALS BRANCH

SHEEP SCAB

BY A. E. MOORE, D.V.S., CHIEF TRAVELLING INSPECTOR

HISTORY AND CAUSE

SHEEP scab, or as it is more properly called, "Scabies in sheep", is an extremely contagious disease. It is caused by a small animal parasite, which lives on the skin of the animal and is known as a "mite", technically called "*Psoroptes communis*." These mites are about one-fiftieth (1-50) of an inch long. They reproduce by laying eggs and multiply very rapidly; millions may be produced from a single pair in only a few days.

The disease has been known for ages, and has caused great losses in the sheep industry of nearly every country. When allowed to spread, sheep scab causes losses: first, in the production of wool, which is greatly decreased and of poor quality; second, shrinkage in mutton and lamb production, owing to the irritation of the disease causing an unthrifty condition of the animal and loss of weight; third, death, sometimes in large numbers if treatment is not applied.

Although this disease is an extremely disastrous one and highly contagious it can easily be cured if the proper treatment is applied.

SYMPTOMS

When the mite first becomes attached to the sheep it begins to feed by sucking the blood or lymph

from the skin. It is generally supposed that its saliva is poisonous; at any rate the bite produces redness and great irritation of the skin. As it goes on an oozing of the lymph takes place and, finally, as the mites become numerous this lymph with other foreign matter of the skin collects and produces scabs or crusts. When this stage is reached the wool begins to fall out, especially in patches on the shoulders, sides and back. The first symptom noticed is that of itching. The animal becomes restless, rubs against objects, scratches with its hind feet, and pulls tufts of wool from the sides and back with its mouth. If the skin is scratched by the hand the sheep makes a peculiar champing motion with its lips and jaws, evincing extreme satisfaction.

As the disease advances large areas of wool fall out; the scabs become thick, often crack and bleed, and many of the animals may die.

In the early stages it is sometimes difficult to positively diagnose sheep scab, as lice, ticks and other conditions of the skin often produce intense itching and sometimes loss of wool. An examination, under the microscope, of scrapings from the skin in these cases, however, will fail to reveal the mites, or their eggs.

As the mites of sheep scab live on the surface of the skin, a close examination of scrapings containing

scabs and tufts of wool will usually reveal the insects or their eggs.

TREATMENT

As sheep scab is purely an affection of the skin, the only treatment consists of an external application which will kill the mite.

There are numerous dips used, but the most effective and the one adopted by this Department as the official dip consists of lime and sulphur and is made as follows:—

To make 100 gallons of dip, weigh carefully

10 pounds of unslaked lime and

24 pounds of flowers of sulphur.

The lime is first slaked in enough water to make a paste; the sulphur is then added to this and thoroughly mixed to the consistency of mortar. Place this lime and sulphur mixture into 30 gallons of boiling water and boil for three hours, adding water as it boils away to keep the proportion the same. Keep stirring this mixture while it is boiling until the sulphur is all dissolved. After it has boiled for three hours allow the mixture to settle. Then carefully pour off the dark chocolate coloured fluid. Measure it and add enough warm water to make 100 gallons. Do not use the sediment, as it is injurious to the sheep. If a large amount of dip is needed the same proportions of lime and sulphur are used, but in larger quantities.

There are many different kinds of vats for dipping sheep, from large cement swimming tanks which are used by the ranchers to portable tanks large enough to submerge one or two sheep at a time, and used by small sheep growers.

Detailed plans for vats or tanks will be supplied by the Department on application.

DIPPING

Dipping consists in completely immersing the sheep in the dip, either by swimming them through

vats or holding them in smaller tanks.

In dipping sheep the following directions should be strictly followed:

- 1st. The sheep should be clipped.
- 2nd. The dip must be kept warm, from 100° F. to 105° F.
- 3rd. The sheep must remain in the dip, completely covered, except the head, for at least two minutes (by the watch).

Care should be taken in handling the animals and the dip should not be allowed to enter the nostrils. When it is time to take the sheep out, place the hand over the nostrils and quickly plunge the head under. Then remove the animal and place on a draining board which should be so arranged that the drippings will flow back into the tank.

As the first dipping only kills the live mites, this treatment should be repeated in from ten to fourteen days. During this interval the eggs which are on the animal have hatched, but the new mites are not mature enough to lay eggs and the second dipping will kill them, and the sheep will be completely cured. In a few very bad cases where the crusts are very thick a third dipping is sometimes advisable. All contact sheep, whether they show any symptoms or not, should be twice dipped.

CLEANING AND DISINFECTION

Although the mite of sheep scab is unable to propagate except on the skin of sheep, it will live for some time on fences or with objects with which diseased sheep have come in contact. All pens and yards that have been occupied by scabby sheep are therefore infected, as tags of wool, straw or litter may harbour the mites and eggs.

Immediately after the first dipping the manure from all infected pens should be removed and ploughed under, and all pieces of wool and litter collected and burned. Every place occupied by diseased sheep and where they have rubbed should be

thoroughly cleansed and disinfected and then whitewashed. The dip that is left over from the first dipping may be used to some extent for disinfecting the premises, but should not on any account be kept over to be used for the second dipping, as it soon spoils.

After the second dipping the pens should again be disinfected, and it is always advisable, if at all possible, to at once remove the sheep to new quarters which have never been occupied by sheep. All the infected pens and yards should be fully exposed to the sunlight, as the sun is one of the best destroyers of the mite.

THE CONTROL OF SHEEP SCAB IN CANADA

The disease has never existed to any alarming extent in Canada, but in the years 1907 and 1908 sheep scab was quite prevalent in Western Ontario. Inspectors of this Branch were constantly finding the disease, which nearly always traced to shipments from the Toronto Stock Yards. We located the origin of these shipments and, after a great deal of

investigating, finally found the centres of infection.

The diseased sheep, and all those in contact, were quarantined and twice dipped in lime and sulphur, and the premises thoroughly cleansed and disinfected. This work was done under the personal supervision of the Inspector.

A general inspection of all the sheep in the infected counties was made, which resulted in our finding some scattered cases.

Two years later quite an extensive outbreak was discovered in the province of Quebec. This was dealt with as above, and I am pleased to say that our work has proved entirely satisfactory. From that day to this, not one case of sheep scab has been found in any of the Eastern Provinces.

As sheep scab is one of the diseases dealt with by this Department, owners of sheep who suspect the disease should at once notify the Government and an Inspector will be sent to investigate. If the disease proves to be scab, the Inspector will give all assistance possible to eradicate it.

THE LIVE STOCK BRANCH

EASTERN STORAGE FOR WESTERN WOOL CLIP

BY JOHN BRIGHT, LIVE STOCK COMMISSIONER

ON behalf of Canadian wool growers the Honourable Martin Burrell has arranged for the rental of suitable premises in Toronto for the storage of the wool of the various wool growers' associations whose clips will be graded by the wool experts of this Branch. It is expected that this year the Western associations will take the largest advantage of this arrangement and that, in all probability, from one and one-half to two million pounds of wool will be shipped to Toronto for this purpose. The wool, as received from the associa-

tions graded by the Government officials in the field, will be held for sale by the Department acting as the custodian for the growers and subject to their order. It is anticipated that satisfactory arrangements may be concluded between the association and the banks, by which money will be advanced to the growers on warehouse receipts after the wool is sealed in the cars at shipping point. The wool will be fully insured and a charge to cover insurance and storage expenses will be made, the amount of such charge to be determined later. The services of the graders and de-

partmental officials will be given free.

The present undertaking by the Department has been decided upon following a conference with the Minister by representatives of the Western associations and as a result of an investigation of the situation by officers of the Department. The market for Canadian wool is in Eastern Canada or in the Eastern United States, where practically all the largest woollen mills are located. There are no woollen mills in Western Canada. Largely owing to this fact, Western growers have been unable in the past, even though the wool in the last two or three years has been carefully graded and assembled in bulk at several important shipping centres, to secure satisfactory competitive bids. Permanent storage capacity being unavailable, the growers have been obliged to accept whatever bids could be obtained and, consequently, have always been at a

disadvantage in marketing their product. Further, it has become clear this year that, unless the wool could be shipped east for sale, it would practically all be exported to the United States. Eastern buyers have freely indicated their general support of a movement which would provide for the storage of the Canadian wool clip in Eastern Canada, as in this way they would have full opportunity to bid for the grades they require in their mills. It is believed, therefore, that, as a result of the service which the Department is prepared to render, that a large portion of the Canadian product will be retained for use in this country and that, at the same time, the growers will have the advantage of being able to obtain, under the storage conditions, the highest price which the firm position of the wool market would warrant them in expecting.

MORE POULTRY AND EGGS NEEDED

BY W. A. BROWN, M.S., CHIEF OF POULTRY DIVISION

IN connection with the work carried on under the Markets Policy of this Branch it has been learned with assurance that there is great room for profitable development in the poultry industry of Canada. What is needed is a greatly increased production of such a quantity and quality as is desired by the British market. Owing to scarcity of food last year, the poultry stock of the country was greatly reduced, but with the cleaning out of many poultry flocks much inferior stock was got rid of, which opens the way for many to begin on right lines. The shortage in the actual number of birds kept may be overcome to some extent if those who have charge of poultry will use diligence and judgment in making the most of their opportunities this year. The officers of this Branch in the various provinces, who are in close touch with the poultry industry,

give the assurance that there is a better sentiment prevailing on the part of farmers generally with respect to the poultry business than ever before. Indications point to a much larger distribution of eggs for hatching and day-old chicks of improved stock than usual.

Canada has all the requisites for the production of a quantity far in excess of her own requirements, and with her favourable climatic conditions can, with proper care and attention, produce quality equal to the best in the world. Only the fringe of production possibilities has been touched up to the present. The western provinces, with their volume of cheap feed, are the natural home for the Canadian hen. The bulk of the surplus at the present time comes from the provinces of Ontario, Prince Edward Island and Nova Scotia. New Brunswick and Quebec do not produce sufficient

for their own requirements. These provinces must and will do more. It remains principally for Ontario, Prince Edward Island and the western provinces of Manitoba, Saskatchewan and Alberta to demonstrate to the rest of Canada and the Empire as a whole what they can do in this connection in this great hour of trade expansion.

According to the last census, Canada had some 29,000,000 hens; a few more, in fact, than the single state of Iowa. There may be possibly forty or fifty million hens in Canada at the present time. In order to meet our obligations and live up to our opportunities in the matter, the slogan of every poultryman should be "150,000,000 hens for Canada in two years". How can it be done? Is it not possible in this country to create in the minds of producers generally the steadfast impression

and belief that this development is going to be brought about, and to enlist the active services of every breeder and distributor of pure-bred poultry in a big national production campaign?

The Live Stock Branch through the Poultry Division is doing all that it can, through its various connections, to bring about the increase in production and the improvement in quality necessary to take the greatest possible advantage of our present opportunities. The organization of Co-operative Marketing Associations is being pressed more vigourously than ever before. The importance of increased production is being emphasized at every opportunity, and arrangements are being made whereby a very decided improvement in quality, particularly of western eggs, will be brought about this year.

THE LATE DANIEL DRUMMOND

Mr. Daniel Drummond, Chief Inspector of the Record of Performance, died in Ottawa, March 21st, at the age of sixty years. Mr. Drummond entered the Government service as an officer of the Department of Agriculture in 1900. When the Record of Performance was organized in 1906, Mr Drummond was put in charge of the work under the Live Stock Commissioner and retained that position until the time of his death.

PART II

Provincial Departments of Agriculture

INCREASED CROP PRODUCTION

In all the provinces of Canada the Departments of Agriculture and Education are bending their energies towards "increased crop production in 1917." The methods adopted in a number of the provinces are outlined by responsible officials in the following symposium:

NEW BRUNSWICK

SCHOOL COMPETITION IN CROP PRODUCTION

BY R. P. STEEVES, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL INSTRUCTION

AT this time when our province is being drained of its young manhood in defence of the principles of right, an appeal is being made to the school children to give what help they can to supply deficiencies in food products. With this end in view, we shall carry out a provincial school competition in crop production. As potatoes constitute the crop of perhaps the most widespread growth, this crop has been chosen for the competition, which will be carried out under the following conditions:

1. Each competitor is required to use one-quarter of an acre of land.
2. Pupils from twelve to eighteen years of age are eligible to enter.
3. Each pupil entering the contest must secure the written consent of the parent.
4. All pupils entering must agree to avail themselves of opportunities for reading and studying bulletins, pamphlets and general literature dealing with the potato as a plant, the preparation and require-

ments of soil for planting, selection, cutting and treatment of seed, methods and plans of planting, spraying of plants.

5. All competitors must keep records of reading and study, also of the various operations performed throughout the season, and on or before October 15th must submit a carefully prepared composition dealing with the production period. This composition must also contain a report of expenses incurred during the season.

6. Each competitor must exhibit product grown at the local School Fair, amount not less than one peck.

7. Seven provincial prizes, 1st, 2nd, 3rd, 4th, 5th, 6th and 7th will be awarded.

8. Prizes of value will be selected to be announced later.

8. Entries will be received up to May 1st, but study and reading should begin during the winter months.

Full information including a complete set of rules with necessary forms, also publications dealing with potato culture, will be provided on the application of teachers to the Director of Elementary Agricultural Education at Sussex, N.B.

AN APPEAL FOR GREATER PRODUCTION

BY R. P. STEEVES, B.A., DIRECTOR OF ELEMENTARY AGRICULTURAL INSTRUCTION

IN the February number of the "Rural Education Monthly", which is sent to all the school teachers in this province, an appeal is made to the teachers and pupils to do what they can to add to the amount of the food supply in this province. The growing of vegetables has been encouraged from the beginning of school gardens in this province, indeed these have been largely devoted to the production of vegetables and of some grains. Perhaps, we have erred in the past in not having enough flowers. Our reason for this is that we wished to lay a foundation through our nature study of economic plants for a greater appreciation of country productions. We wished our nature study to relate more to the economic plants than to wild plants and forest trees. Our reason for this has been that about all the botany and nature study that has been carried on in the schools in this province has

dealt with wild plants. The nature study of vegetables, of domestic animals, and that side of nature study of birds that deals with their value to the country has been neglected. This year both the school garden and home plot work of the pupils will be largely given up to the production of economic plants similar to those that are being raised in the districts by the people. We do not intend to neglect beautification of the school grounds. We are dealing with that likewise, but the area of ground used will be largely for vegetables.

In all efforts, while the idea of production is in the work, the idea of education will predominate. Our purpose is that the school garden shall continue to magnify instruction that will help in the development of the resources of the community. Usable knowledge obtained through practice and observation is our aim for the pupils.

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN regard to *special ways* being adopted by the Department of Agriculture to increase crops and animal products in the province this year, I may state that it is our feeling that the farmers are pretty well educated to their duties, and in the main are trying to do their best. Consequently we are not putting on the same direct kind of a policy as we did in co-operation with the Federal Department the first year of the war. However, through western Nova Scotia we have co-operated with the C. P. Railway management in putting on a series of patriotic rallies at important points along the railway. To encourage attendance at these rallies the railway

has granted special excursion rates. Moving pictures illustrating farming industries were used, and proved attractive, helping thereby to interest large audiences to hear the message of the meeting of bigger crops.

At all our short courses one session at least was set aside for discussion of ways and means of increasing crop production. At these sessions it was taken for granted that the farmer is as alive to the situation as any one else, and that his interest in the meeting lay mainly in hearing the lines along which farm production should be encouraged.

At the present time plans have been completed for a provincial farm competition in which the Halifax

Board of Trade has taken the lead. They have provided sufficient money to offer handsome prizes for competitions, the province being divided into four districts for this purpose, and separate prizes being awarded in each district. The Department of Agriculture is rendering all the assistance it can to this scheme, which is regarded with high favour, not only because it provides prize money for a desirable competition, but because of the practical character of the stimulus which the business men of Halifax are trying to give to the appeal for greater agricultural production.

Appeals are also being issued from the Department of Agriculture in connection with town vegetable gardening. In at least one town, Truro, a competition along this line will be offered, and it is hoped that several other towns will follow in this movement. In all of these cases the Department of Agriculture is co-operating with the various local bodies who are taking an interest in encouraging this form of production.

The Department has also taken measures to insure a supply of seed wheat for the increased number of farmers who will this year sow part of their land to that crop. Fortunately the wheat crop of the province for 1916 was a good one, and there is accordingly a large supply of

home-grown seed available. The Department has urged farmers to depend upon this seed rather than upon imported seed. In addition we have purchased a very considerable quantity of home-grown seed which is offered for sale at cost price in districts where we anticipate shortage, and in one place we have guaranteed a seed supply house against loss if they will make sure of having the amount of seed wheat on hand which is thought to be necessary to supply the needs of the farmers in that part of the province in which this seed supply house stands.

In all this campaign, whether it be in platform speeches or press articles, or in short course classes, special stress has been laid upon the importance of conserving the live stock of the country. It is feared, however, that the temptingly high prices offered by buyers, is militating seriously against this increased live stock production campaign. Just to what extent the live stock is being depleted we hardly know. It is fortunate that the educational campaign for the improvement in the character of individual animals has proven effective, and that hence the reduced number of live stock may produce as much food in the form of milk and butter and beef, etc., as the larger number produced in years gone by.

ONTARIO

INCREASED GARDEN AND FARM PRODUCTION

THE Ontario Department of Agriculture is endeavouring to bring about an increased production during the coming season by the adoption of two plans. First, an effort is being made to emphasize the importance of using all the vacant land or backyard gardens around cities, towns and villages. It is felt that these can be brought

under cultivation by a little additional energy on the part of the residents of towns, cities and villages, who can do the cultivation in their spare hours in addition to other work. While the unit would necessarily be small, the aggregate would be very considerable and a great addition would be added to the food supply of the province at the end of

the season. To this end an advertising campaign is being inaugurated, and speakers will be sent out to address gatherings which may be interested in the subject. The co-operation of the horticultural societies, the women's institutes, and other organizations is being enlisted and the interest which has already been developed and the demands received by the Department for speakers indicate that great good will likely be accomplished.

In the matter of increased production on the farms, it is fully realized that the labour question is the crucial point. To secure an adequate supply of labour and, at the same time, not detract from enlistments or munition factories is not an easy matter. It is felt, however, that some good can be accomplished by having retired farmers, or others with leisure of previous farm experience who now live in towns and villages, go out for a few months.

In addition, able-bodied men who may only have ten days to three weeks vacation could render service and a number of these have already offered themselves. Advertising will also be utilized in bringing this to the attention of the public.

Mr. J. Lockie Wilson, Superintendent of the Ontario Horticultural Association, has issued a circular letter to secretaries of horticultural societies throughout the province urging the members of the various societies and others with whom they come in contact, to utilize their own gardens and available vacant lots for the production of food crops. The secretaries are urged to call meetings to arrange the details of this work. The Department offers the services of practical men to give addresses and to supply literature on gardening and poultry raising.

INCREASED PRODUCTION OF POULTRY

FOR the purpose of increasing the production of poultry and eggs in the province of Ontario, the Department of Education has made arrangements with the Department of Agriculture of the province to supply to the pupils of public schools in which classes in agriculture are maintained, hatching eggs from improved strains of Plymouth Rock fowls. The eggs will be supplied by the Poultry Department of the Ontario Agricultural College

in limited quantities to be delivered at fifty cents per dozen in one hundred egg lots. In a circular issued to the teachers of the Public and Separate schools in the province by Dr. J. B. Dandeno, Inspector of Elementary Agricultural Classes, it is pointed out that the hatching of eggs and the rearing of chickens is regarded as a legitimate and useful form of home project for pupils of the third, fourth, and fifth forms of these schools.

HOME GARDENING CAMPAIGN

THE Ontario Department of Agriculture during the late spring of 1916, offered to provide vegetable seed to the members of a limited number of women's institutes on condition that each member plant the seeds according to a plan submitted, and follow the written instructions sent out from the Department. Owing to the lateness

of the season when the offer was made to the institutes, only a limited number could be granted seeds, but such interest was taken in the competition and the growing of vegetables was stimulated to such an extent that the Department decided to make a somewhat similar offer to all institutes which comply with the conditions outlined.

The Department has a three-fold purpose in making this offer—first, to stimulate a larger production of a greater variety of vegetables during war time; second, to inform Canadians as to the dietetic value of vegetables; third, to instruct in methods of cooking, canning and preserving of vegetables and fruit.

The Institutes Branch, Department of Agriculture, will supply not fewer than five nor more than ten lots of seeds, to as many members of any Women's Institute, on condition that each contestant that enters, will comply with the following rules governing the competition:

(1) Gardens measuring 30 x 40 feet must be put in according to the plan furnished by the Department, except in cases where a plot of different dimensions is more desirable.

(2) Each person receiving seed will be required to make a report to the Institutes

Branch, Department of Agriculture, through the secretary of her local branch, this report to have the date of sowing of each vegetable, date of maturity, quantity produced, quantity canned, disposal of canned vegetables, etc.

(3) Canned vegetables should be exhibited at a regular institute meeting, or at such time and place as the members of the institute decide. It is suggested that the local branch arrange to have an exhibit of vegetables, both raw and canned, at a local fall or school fair or at some public gathering. In case a portion of the vegetables grown are to be disposed of for Red Cross or Patriotic purposes, it is doubly advisable that such an exhibit be prepared.

(4) In those cases where a branch or group of branches wish to give small cash prizes based upon the record of the garden throughout the season, the exhibit of canned goods, together with the ability of the competitor to explain methods followed in canning, the Department will endeavour to furnish a judge.

(5) Peas, tomatoes, corn and rhubarb used for canning need not be grown upon regular plots.

SASKATCHEWAN

PRODUCTION IN THE SCHOOL GARDEN

BY W. W. THOMSON, B.S.A., DIRECTOR, CO-OPERATIVE ORGANIZATION BRANCH

NOW that our enemies are endeavouring by means of the submarine campaign to stop the flow of foodstuffs and other materials to the Old Country, and to the armies of the Allies, it is absolutely necessary that all our energies be devoted to the production of useful foodstuffs or munitions and that none of these be wasted.

In this great work the boys and girls can take a part. The pupils of the schools of Saskatchewan have responded nobly to the appeals for funds for patriotic purposes. During the coming summer they will increase their efforts and continue to "do their bit" in the great war. It has been suggested that the greater portion of every school garden be devoted to the growing of vegetables. In several of the provinces of Canada preparations are now being made for the work. The

resulting increase in the food supply of the country will benefit the individual producer, the individual home, the province, the nation, the Empire and the Allies, and will reduce the high cost of living for all. Teachers are therefore recommended to interest their pupils this year in the growing of vegetables in the school gardens and to arrange for the satisfactory disposition of the produce.

That a portion of every school garden in Saskatchewan be devoted to the growing of vegetables, and that the proceeds from the sale of these be given to the fund for the relief of Belgian children, is a suggestion made by Mr. Jas. E. Cowie, of Neudorf, and it is one which we can heartily recommend. Mr. Cowie's letter reads as follows:

"No school in Saskatchewan is complete without a school garden and there are few

schools that cannot have a garden if the teacher takes the lead in trying to obtain one. Ground that has been broken is no doubt better than freshly broken prairie, but the latter can be made to yield a good crop the first year.

"The plan that I wish to suggest is, that every school in Saskatchewan has a school garden and that part of that piece of land be planted and cared for by the children, guided by the teacher and that what is grown on it be sold next fall, the proceeds to go to the Belgian children.

"The school garden may be made an experimental centre on a small scale. New varieties of potatoes might be planted and the people of the community would be benefited by buying the potatoes from the

children for seed. It takes no more care to grow the best varieties of potatoes and little more outlay than it does to grow common ones and the yield from the former is frequently greater and the crop may be sold at twice the price.

"The Belgian children may not need assistance next fall. We earnestly hope they will not. The war may be over before the autumn. Let us earnestly hope that it may. If the war is over and there are not others who are unfortunate, the money obtained may be kept by the various schools having the gardens, but if there is need is there a school child that would not be glad to say? 'My school has money that we made by having a school garden.' Let our school gardens have a dual purpose."

ALBERTA

INCREASED VEGETABLE PRODUCTION

BY JAS. C. MILLER, B.Sc., PH.D., DIRECTOR OF TECHNICAL EDUCATION

THE work in school gardening in this province has always made vegetable growing and demonstration grain plots a major feature.

The instruction given in the Summer School for Teachers, the Normal Schools, and through the inspectors, has emphasized the improvement in methods of production. Last year in the cities the school gardens were devoted almost wholly to the pro-

duction of vegetables. This year, the schools, the municipal authorities and the Vacant Lot Garden Clubs, are co-operating to utilize vacant lands within the city limits.

In rural districts it is probable that the older pupils can contribute more toward increased production by assisting in farm operations at their homes, than by giving much time to school garden work.

BRITISH COLUMBIA

EFFORTS FOR GREATER PRODUCTION

BY WM. E. SCOTT, DEPUTY MINISTER, DEPARTMENT OF AGRICULTURE

"MORE Production" is the slogan at the present time, and throughout Canada farmers have been urged to do all that they can, as their duty to the Empire, to increase production of stock and crops.

Under present conditions, with the great scarcity of labour which exists, it is, of course, a difficult matter for the farmers to act on the advice given, though they are doing every-

thing that they possibly can in the adverse circumstances under which they labour.

In this province, by means of newspaper articles, addresses at public meetings, articles in our *Monthly Journal*, etc., I have been doing all that I possibly can to urge farmers to keep more and better stock, and grow more and better crops. Then, the educative work which we are carrying out through the different

branches of this Department, is all directed towards increasing crop production by showing farmers how they may, by the adoption of right methods, secure larger crops and more productive stock.

We have done, during the last few years, a very valuable work in selected seed distribution, which has undoubtedly resulted in materially increasing the production of different kinds of crops. Farmers have had it clearly demonstrated that it is only by the use of the best seeds that they will secure the best crops. Similarly, by the formation of cow-testing associations the average pro-

duction of our dairy herds has been materially increased in those districts in which they have been started.

Our crop competitions also all tend toward increasing production by encouraging the spirit of friendly rivalry between farmers in the growing of crops which must inevitably tend towards the adoption of more correct farming methods, and, consequently, larger and better crops. There are many other lines of work of which we are making a specialty at the present time, which all have as their object, increasing production.

Produce, produce, produce! It is a world challenge as we stand at the threshold of another springtime. Never before have farmers faced a growing season when their efforts to grow something to eat seemed so certain of reward. From reichstag, parliament and congress come warnings that another half-crop will put whole nations on starvation rations. From a world viewpoint things are bad enough as they are, but the silver lining is the 1917 harvest. The genius of those into whose hands the soil is given is put to the test. How will it be met? Is the work of the year planned for maximum production? Will the seed grow? Will it yield heavily? Is the land to be put in good tilth? Is there power enough or equipment enough? Is the soil fertility high, or can it be made so? Are the animals well enough bred to turn rough feed into maximum amount of meat, milk, wool and power? Are the wastes stopped, the inefficiencies corrected? Is every man at his proper post in the farm organization? All that is left is the weather, and many centuries of work in the open fields have taught the farmer how to substitute faith for prophecy in that regard.—*Breeders' Gazette*.

ORGANIZATION FOR MARKETING

Co-operation in the marketing of agricultural products has made immense strides in Canada of recent years. The system has been found of the greatest benefit in relieving the farmer of the burden of bargaining and sale and in the securing of better, fairer and uniform prices. Although much progress has been made in every province of the Dominion, much remains to be done and more is constantly being done both by local and general organization. Federal and provincial legislation is playing a prominent part by guidance and regulation and federal and provincial Departments of Agriculture are actively aiding in a work that is at the very foundation of the nation's prosperity. In the advancement of marketing and of co-operative effort education, as in all other of the affiliated as well as the more intimate branches of agriculture, must play its part and, therefore, here as elsewhere we find THE AGRICULTURAL INSTRUCTION ACT playing its part. To ascertain the steps that have been taken in the different provinces in the furtherance of necessary activities in organization for marketing by co-operation, and in other ways, leading officials were requested to send for publication in THE AGRICULTURAL GAZETTE OF CANADA particulars of the methods and policy that were being pursued, with the result that the replies herewith following were received:—

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN the year 1908 "An Act to Facilitate the Incorporation of the Farmers' Fruit Produce and Warehouse Associations" was passed by the Legislature of Nova Scotia. This Act has been amended from time to time so that it now contains special provisions under which local companies of farmers and fruit-growers may unite for the purpose of purchasing all kinds of supplies, and of disposing similarly of any produce of the farm including fruit, field products and live stock and live stock products. The same legislation contains provisions for the union of the various local companies that may desire to co-operate with each other. This union has been consummated into the United Fruit Companies of Nova Scotia, which organization now purchases and distributes among the local units all kinds of produce referred to in the foregoing, and similarly disposes of all produce which farmers may wish to dispose of co-operatively.

All the companies so far organized under the provisions of this Act, have been those in the fruit-growing

sections of the province, although there is nothing, despite the title of the Act, to prevent farmers in any part of the province whether engaged in fruit growing or not, to organize and carry on a business under the wide provisions of this "Farmers' Produce and Warehouse Association" legislation.

In the year 1914, "The Farmers' Co-operative Societies Act, 1914," was passed, which makes provision for the incorporation without fee under the Nova Scotia Companies' Act of any society of farmers who may co-operate for the purchase of "manures and artificial fertilizer of all kinds, feeding stuffs, seeds, spraying materials, spraying outfits, and farming implements of all kinds," and may also make sales of any produce of the farm.

Societies incorporated under this Act are limited in the material they may purchase—practically to what may be regarded as materials required directly in agriculture (not household commodities) but they may dispose of any products of the farm, including live stock.

The Department has for the most part recommended societies of farmers in all except the fruit-growing sections, where special conditions prevail, to co-operate under the latter Act, and quite a number have now co-operated under this Act.

It was felt that, in the more scattered settled areas of the province to give too wide powers to such societies might lead to disaster. Hence it happens at the present time that all the societies in existence in the Annapolis Valley and adjoining fruit-growing sections, are incorporated and are doing business under the "Fruit Produce and Warehouse Legislation," and all societies doing business outside of the fruit-growing areas are now doing business

under the "Farmers' Co-operative Societies Act, 1914."

Except by its general educational propaganda the Department of Agriculture has up to now not given explicit aid to any of these organizations. In fact the whole organization in the fruit sections, although having the endorsement of the Department of Agriculture, has been organized by private activity. Outside of the fruit sections, in the more scattered areas, some assistance in the way of meetings to explain the character and purpose of this co-operative organization have been held. In all cases provision has been made for incorporation without fee, which may be regarded as an indirect Government support.

QUEBEC

BY E. BELANGER, JOURNAL D'AGRICULTURE

LIMITED as we are by the space allotted to us, and desiring to comply with the request of the Editor of THE AGRICULTURAL GAZETTE, we do not propose to give a complete account of the commercial organization of agriculture in the province of Quebec in the whole of its scope or of its ramifications, either as regards the purchase of supplies for the farmers or the sale of farmers' produce. We shall limit ourselves to a brief description of the selling system generally adopted by the various agricultural organizations which are in part under the control of the Quebec Department of Agriculture.

THE QUEBEC CHEESEMAKERS' CO-OPERATIVE ASSOCIATION

This association deserves first consideration among the 170 agricultural co-operative associations which are now operating in the province of Quebec. This association was established in 1910 with only thirty members at the start; it has now 3,000 members and its total yearly amount

of business exceeds \$3,000,000.

For the last three years, this association has paid a dividend of 6 per cent to its stockholders and it will soon have a reserve fund of \$50,000. The capital is made up of members' subscriptions. The shares are worth \$10 each and payable in ten years at the rate of \$1 per year.

The association owns large establishments and warehouses in the city of Montreal where it receives the produce of its members, or the produce of the local co-operative associations which have subscribed one or several shares to the capital stock.

The association handles butter, cheese, bacon hogs, fowls, dead and living, eggs, honey, maple syrup and sugar, beans, fat calves and rabbits.

These products are handled, graded and sold according to the following system: As soon as the goods are received, they are examined, the quantities are checked and the condition verified; complaints, if necessary, are made by the association, which sees that the shippers get satisfaction from the transportation

company. Instructions are given to the members regarding the proper way to prepare their products for shipment.

Then the products are weighed and arranged for grading. All precautions are taken to avoid any confusion, and disinterested persons of known competence, endeavour to make as fair a grading as possible.

When the grading is over, the products are sorted and sold according to their quality. Sales are held every week day, by auction or otherwise, but always for cash. The returns are handed to the producers at the end of each week. If the same

defect is often noticed in a lot of butter or cheese, or in the quality of any other product, notification is at once given to the interested parties.

The association warehouses are equipped with the most up-to-date cold storage facilities, and perishable products which cannot be sold on the day they are received are kept in as good a condition as possible.

The prosperity of the association is well shown by the financial statements which are published every year on the 31st of December. The following is the statement for the year 1915:

ASSETS

Cash on hand, 31st of December, 1915	\$4,146 78
Furniture, etc	2,597 41
Merchandise (inventory)	12,578 30
Receivable accounts, guaranteed by goods kept in warehouse	15,418 67
	<hr/>
	\$34,741 16
Payments on shares (1915)	\$1,532 50
Accounts	55 94
Total surplus	33,152 72
	<hr/>
	\$34,741 16
Amount subscribed	\$17,610 00
Amount paid on shares, December 31st, 1914	\$2,088 00
Amount paid on shares in 1915	1,532 50
	<hr/>
	3,620 50
Balance due on shares	\$13,989 50

AUGUSTE TRUDEL,
Manager.

Montreal, January 5th, 1916.

That the association is still rapidly progressing may be inferred from the fact that it gives the greatest satisfaction to its members. It has always secured the highest market prices, the reputation of Canadian produce which it handles and particularly butter and cheese has steadily gone up and the prices received by the producer are equal to, if not above, the prices paid by the best firms.

It should be stated here that the system of payment according to quality, which was adopted at the very start by the association, has encouraged the painstaking farmer to improve the quality of his pro-

ducts. The province of Quebec has gained an enviable reputation on foreign markets by the quality of the butter and cheese which it exports. During the past season, over four hundred butter and cheese factories sold their produce through the association.

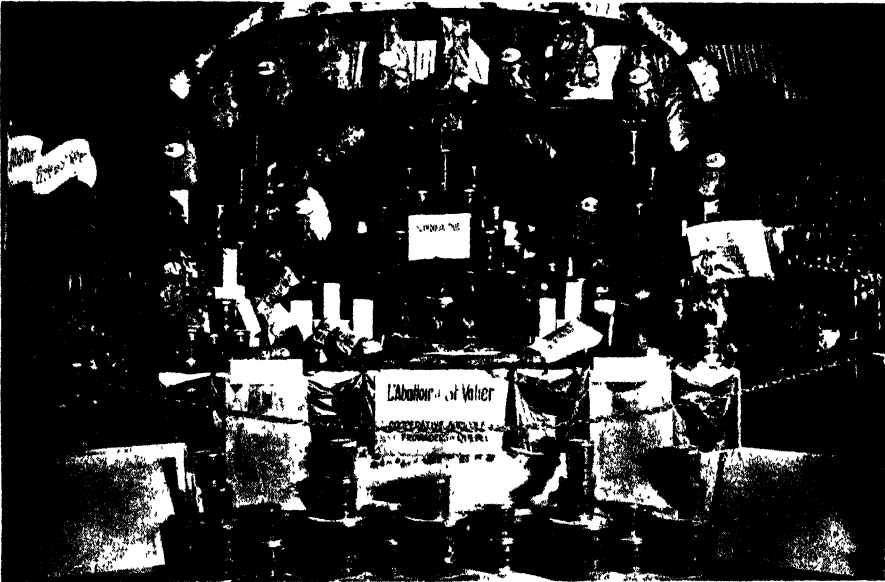
By taking over the management of the slaughter schoolhouse of St-Valier and that of Princeville, the association has also obtained a better market for the bacon hog producers. These slaughter houses have a capacity of fifty hogs per week. The association will continue the educational work started by the Department of Agriculture and help the farmers to

improve their methods of breeding, so as to get the maximum value out of their dairy by-products.

The association publishes a weekly bulletin which is sent free to the members and keeps them well informed on the fluctuations of the market; it also deals with current

association was organized, the most individual farmers could get was from 15 to 20 cents a pound.

Again, payment of tobacco according to quality has caused a great deal of improvement in the methods of growing, packing, etc., by insuring a premium to the careful grower.



EXHIBITION OF BACON, CURED MEATS, LARD AND OTHER PRODUCTS FROM THE CURING-HOUSES UNDER THE MANAGEMENT OF THE QUEBEC CHEESEMAKERS' CO-OPERATIVE AGRICULTURAL ASSOCIATION

subjects and brings out useful comparisons.

THE YAMASKA VALLEY TOBACCO GROWERS' CO-OPERATIVE ASSOCIATION

This association, established in 1911 with two hundred and fifty shareholders, deals chiefly with the grading and sale of tobacco. Its paid-up stock is \$27,670 and its total yearly amount of business about \$130,000.

It owns large warehouses, packing and curing rooms, curing houses, etc. The main building measures 212 x 60 feet. Every year some 500,000 to 600,000 pounds of tobacco are sold at prices varying from 25 to 35 cents a pound. Before the

THE PURE MAPLE SUGAR AND SYRUP PRODUCERS' AGRICULTURAL CO-OPERATIVE ASSOCIATION

This association, organized in 1913 with headquarters at Waterloo has over 400 members. It has already done good work by securing the adoption of a federal law restricting the exclusive use of the word "maple" to the pure produce of the maple. It also endeavours to find markets for its members. Last year, the association received an order for 80 tons of sugar from France and England. The total annual production of Quebec maple groves represents a value of \$1,500,000.

QUEBEC SEED GROWERS' CO-OPERATIVE ASSOCIATION

This association was established in 1914 with headquarters at Ste-Rosalie. It owns large warehouses. The capital subscribed by over 200 members is over \$22,800, and will reach \$30,000.

This association handles pure seed treated with formalin, and purchases

associations which handle farm produce shows that the co-operative feature of our agricultural commercial organization is the one which has received the most encouragement from our provincial Department of Agriculture during the last few years.

Another feature which is likely to encourage the producer to improve the quality of his products is



EXHIBIT OF THE QUEBEC CHEESEMAKERS' CO-OPERATIVE AGRICULTURAL ASSOCIATION, AT THE PROVINCIAL EXHIBITION, QUEBEC, 1916

grain crops after inspection. It has in its warehouses modern fanning mills for the thorough cleaning, grading and sorting of cereals. It has also the necessary grinders for grinding or crushing the seeds of weeds or grain unfit for seed. These ground seeds or grain are sold for the fattening of cattle.

This summary description of the work of the principal agricultural

the system of payment according to quality which has been adopted by all these associations. Already this co-operative selling system has had good effects in making our products better known on foreign markets. It has given such encouragement to our rural population that we may safely predict the most satisfactory results for the future.

ONTARIO

BY F. C. HART, B.S.A., DIRECTOR, CO-OPERATION AND MARKETS BRANCH

RURAL Ontario has a multiplicity of organizations of one kind or another, as the following list (with approximate figures) would indicate:

360 Agricultural Societies	100,000 members
900 Women's Institutes	30,000 "
90 Farmers' Institutes or Boards of Agriculture	19,000 "
300 Farmers' Clubs	12,000 "
1 Experimental Union	5,000 "
60 Egg Circles	2,100 "
70 Fruit Growers' Associations	2,100 "
15 Ploughmen's Associations	1,500 "
3 Corn Growers' Associations	1,200 "
30 Vegetable Growers' Associations	1,000 "
1 Horse Breeders' Association	525 "
2 Dairymen's Associations	500 "
1 Poultry Association	470 "
3 Swine Breeders' Associations	440 "
26 Bee Keepers' Associations	425 "
3 Potato Growers' Associations.	300 "
31 Seed Centres	267 "
1 Sheep Breeders' Association	230 "
2 Onion Growers' Associations	70 "
1 Seed Growers' Association	50 "
1 Tobacco Growers' Association	
1 Bean Growers' Association	
268 School Fairs	61,000 members
75 Junior Farmers' Improvement Associations	1,600 "
160 Creameries	38,000 patrons
1,000 Cheese Factories	40,000 "
1 Ontario Co-operative Fruit Growers' Association.	
1 United Farmers of Ontario.	
1 United Farmers' Co-operative Company.	
20 Breeders' Clubs.	
Milk Producers' Associations.	
Beef Rings.	
Live Stock Shipping Associations.	
Weigh Scales Associations.	

Of these organizations the following would indicate the number engaged in the marketing of farm products:

Creameries.
Cheese Factories.
Milk Producers.
Farmers' Clubs.

There are also a number of miscellaneous organizations handling a variety of products.

Many of these organizations both buy and sell. A number have sent us the amount of business for the last year, summarized as follows:

This of course does not include the full list.

23 Fruit Growers' Associations sold..	\$442,775.70, average \$19,251.08
19 " " " bought	60,477.67, " 3,183.03
Total	\$503,253.37
14 Egg Circles sold.	\$111,035.22, average \$7,931.08
3 " " bought	536.50, " 178.83
Total	\$111,571.72

71	Farmers' Clubs	bought	.....	\$225,267.89, average	\$3,172.78
12	"	"	sold	.....	178,624.39, " 14,885.36
		Total	.....	
				\$403,892.28	
9	Rural Organizations	sold	.....	\$145,011.90, average	\$16,112.43
3	"	"	bought	.....	5,750.52, " 1,916.52
		Total	.....	
				\$150,762.42	

The Ontario Department of Agriculture in no way enters into the business operations of marketing organizations, nor does it market any farm product even as a demonstration. In all cases the aim has been to build up business organizations of producers which are economically sound and self-supporting and able to take their proper place in the economics of the trade in farm products. Through the various branches of the Department, however, and through the District Representatives, and through the Co-operation and Markets Branch, the Department is able to keep in touch with these organizations, and be of some assistance in carrying on those work. Especially since the advent of the District Representative has the Department been able to assist in such organizations. Through the Co-operation and Markets Branch assistance is given in organizing and incorporation, and inspection of the business of co-operative organizations.

The following notes regarding the various organizations might be of interest:

FRUIT ASSOCIATIONS

There are 70 fruit associations in the province, 46 of which are selling the fruit of the members and of those remaining six are buying spray supplies for their members. The rest are purely educational. The province produces annually about 3 000,000 barrels of apples, of which 250,000 barrels, or 8 per cent, are marketed through associations of producers. A large proportion of the fruit produced by these associations is shipped to Western Canada and sold direct to farmers' organiza-

tions. The remainder is sold to the trade or exported and very little, if any, sold by the producers' organizations to consumers. The Fruit Branch of the province does a large amount of its educational work through these organizations. The Fruit Branch also was largely instrumental in organizing the Ontario Co-operative Fruit Association, made up of some 17 local associations shipping their fruit through one manager.

EGG CIRCLES

About 70 egg circles have been organized in the province and at the present time about 30 or 35 of these are in operation. These circles have been organized in the various sections of the province. In only one instance, however, have a group of circles combined their shipments under one management, each circle having an individual business of its own. Practically all of the eggs are sold directly to wholesale houses. In Eastern Ontario a few of the circles are selling to individual customers, such as stores, clubs and hotels. In Western Ontario a number of circles are selling to a chain grocery firm in Toronto. Only one or two of the circles handle any product other than eggs. These one or two handle poultry and operate a hatching station.

VEGETABLE GROWERS

The 30 vegetable growers associations in the province have a provincial organization which meets annually. These organizations for the most part are educational. A few years ago the provincial organization did attempt the co-operative purchase of seeds for its

locals, but for various reasons this has been discontinued. The following organizations handle vegetables for sale: Rainy River Potato Growers' Association, Blezard Valley Association, Lambton Co-operative Association, Farmers' Co-operative Association, Nipissing District, Independent Vegetable Growers' Association of Sarnia, Scotland Onion Growers, Onion Growers of Ontario, Erie Co-operative Association and Hillsburg Potato Growers' Association. Practically all of these associations also deal directly with the trade. The Rainy River Association, however, finds a market for much of its output with the lumber camps, construction companies, etc.

HONEY PRODUCERS

The honey producers are well organized for educational purposes. The locals are united into a provincial association which meets annually at which a very important crop committee is appointed. The committee meets as occasion demands, receives reports as to crop prospects and recommends the wholesale prices which honey should bring. Neither the association or committee, however, sells a pound of honey but merely acts in an advisory capacity. Only one small selling organization has recently been attempted in the province.

SEED CENTRES

Some 31 seed centres have been organized in Ontario by the Canadian Seed Growers' Association. They are of recent growth and only half a dozen centres have as yet seed for sale.

LIVE STOCK

There have been organized some 19 or 20 district breeders' associations, each of which holds an annual sale of the stock of its members. A number of farmers' clubs in the province have been carrying on co-operative shipping of live stock for a

number of years: one club doing a business of over \$100,000 a year. The Manitoulin Marketing Association and the Rainy River Potato Growers' Association also market cattle, lambs, etc. Practically all of the shipments from these associations have been made to stock yards with the exception of a portion of the Rainy River output.

DAIRY PRODUCTS

There are in the province 160 creameries and 1,000 cheese factories. Most of these are joint stock companies, but are co-operative in that the majority of stock is held by patrons. Largely, however, dividends are declared on stock and not on patronage. The Dairy Branch of the Department has a corps of instructors visiting all of these factories regularly.

Milk producers all over the province are organized into milk producers' associations. These do not handle milk, but are used as a means by which the producers can deal with the trade in the matter of contracts, etc. At one centre only, there is a producers' organization which collects the milk of its members and distributes retail with very apparent and growing success.

FARMERS' CLUBS

There are between 300 and 400 of these clubs in the province. They are, of course, mainly educational, but a portion of them are attempting the marketing of one or more products. A few of them are attempting shipping of live stock, and from many has grown the organization of other marketing associations.

MISCELLANEOUS

A number of organizations recently formed are endeavouring to handle a number of commodities. The Manitoulin Marketing Association, starting with the marketing of wool, are now handling lambs and cattle, and

it is their aim to market practically all the products of the Island. The Rainy River Potato Growers' Association not only market potatoes, but a long list of farm products. Thunder Bay District, the Island of Pelee and county of Lambton are also organizing to market a variety of products. In a small number of special crop sections are selling organizations; these include the Onion Growers of Leamington and of Scotland, Tobacco Growers of Essex and Kent, Bean Growers of Kent, Potato Growers at Hillsburg and of Hepworth, etc.

In their initial stages co-operative associations are not equipped to take over all the functions of middlemen and deal directly with consumers. Their trade is largely with the wholesale houses and their operations so far have been too limited to largely effect the price of such farm products to consumers.

In practically every instance, how-

ever, the quality of the output has been increased and there has been less waste caused by marketing of unsuitable food products. For instance, the egg circles have almost wholly eliminated their share of the 17 per cent bad eggs which are estimated to come to market; the result being that the producer has received a slight advance for his produce (one to three cents per dozen average for the year) and the consumer, although paying a larger price for circle eggs, receives much better value. This seems to be the tendency in all these producers' organizations. The advance of co-operation in the province certainly points to the fact that with the growth of these producers' organizations, the elimination of these wastes, and the standardization of the product through organization, the cost of marketing must inevitably be lessened; a gain that should be shared by both producer and consumer.

SASKATCHEWAN

CO-OPERATIVE POULTRY MARKETING

BY W. W. THOMSON, B.S.A., DIRECTOR, CO-OPERATIVE ORGANIZATION BRANCH

THE practice of fattening and marketing poultry co-operatively was introduced in Saskatchewan in 1907, when Mr. W. A. Wilson, the Provincial Dairy Commissioner, established two poultry-fattening stations in connection with the Government-operated creameries at Moosomin and Tantalton. Farmers in the territory adjacent to these creameries brought in their birds and had them fattened at the stations and on set dates, which were widely advertised, a poultry expert in the employ of the Dairy Branch visited the killing stations, gave demonstrations in killing and dry plucking and delivered lectures on general questions relative to poultry raising and marketing. The dressed poultry was

then sold by the Dairy Commissioner and the proceeds, less the cost of fattening and marketing, were returned to the producers. This system of marketing aroused considerable interest and additional fattening stations were added from time to time, until in 1913, eight stations were in operation and 5,126 pounds of poultry were handled.

It was, however, realized that these stations could serve only a limited number of persons in the territory tributary to the creameries, and as many of the producers had become familiar with the methods of fattening and could properly fit up their own birds, it was decided that the fattening stations should be discontinued and that steps should be taken to place the marketing services

of the Department at the disposal of all poultry producers in the province. It had been found that farm dressed poultry did not sell to advantage, largely because the birds were seldom properly killed and dressed, with the result that they did not keep well even in cold storage and it was consequently decided that the Department could render its greatest service by establishing one or more killing and marketing stations to which farmers could ship their home fattened birds alive, to have them killed and dressed in a uniform manner by experts and subsequently sold in bulk quantities large enough to attract the attention of the principal poultry handling firms.

In the fall of 1915, this work was undertaken by the Co-operative Organization Branch, and with the assistance of the Poultry Husbandry Department of the Provincial College of Agriculture a poultry killing and marketing station was operated at Saskatoon during the month of December. Poultry producers were invited to fatten their birds and send them in alive to the killing station. As soon as the birds were received, they were weighed and graded and an advance payment of approximately the prevailing market price was forwarded to the producer. The birds were killed, dressed and placed in cold storage until February, when they were sold and a final payment was sent the producers, returning them everything received from the sale of their birds less the actual cost of handling. A total of 18,799 pounds of poultry was handled through the station and general satisfaction was expressed in regard to the prices realized, the same being from three to five cents per pound higher than local prices prevailing at that season.

In 1916, two killing and marketing stations were operated along the same lines, one at Regina and the other at Saskatoon, both being open from November 13th to December 16th. The following table shows

the quantities of poultry handled at each station:

KIND	Regina	Saskatoon
Chickens	9,169 lb.	14,280 lb.
Fowl	7,812 "	10,188 "
Turkeys	6,519 "	6,900 "
Ducks	1,101 "	817 "
Geese	97 "	789 "
Total..	24,698 lb.	32,974 lb.

As this poultry came in to the killing stations, advance payments at the following rates per dressed pound were sent the shippers: For No. 1 chicken, 15 cents per pound; No. 1 fowl, 12 cents per pound; No. 1 turkeys, 18 cents per pound; No. 1 ducks, 14 cents per pound; No. 1 geese, 14 cents per pound, and for lower grades at corresponding prices, funds for the purpose being obtained from the Provincial treasury under THE AGRICULTURAL INSTRUCTION ACT. At the time of writing the bulk of the dressed poultry is still in storage in Regina and Saskatoon, but it is expected that a sale will be made in the near future and that a very substantial final payment will then be forwarded to the producers.

Plans for extending the work and making it of more general service to poultry raisers in the outlying portions of the province are under consideration. It is evident that some steps must be taken to reduce the expense of getting the birds into the stations, as this is at present the most serious drawback to the system. A solution may be found by establishing additional killing stations at points where several railway lines converge, or probably by arranging to collect the consignments through a specially-equipped freight car, operated on a pre-arranged and well advertised schedule over the railway lines tributary to each killing station. Some solution will certainly be found and the work will be extended until every poultry producer will know that he has an assured market for all of the poultry which he can produce.

ALBERTA

SUMMARY OF ADDRESS DELIVERED BY H. A. CRAIG, B.S.A., DEPUTY MINISTER OF AGRICULTURE,
BEFORE THE CONFERENCE OF RURAL LEADERSHIP

DOUBTLESS more people would be on the land if farming were more profitable. This could be greatly helped by an improved system of organization for marketing surplus products. It frequently happens that goods are shipped long distances to distributing houses with heavy freight charges only to be shipped back over the same lines by the distributing houses where the goods are finally disposed of to the customer. A short time ago a seed-house in Toronto purchased six cars of Alberta timothy seed and shipped it to Toronto with a freight charge of over \$300 per car. They put it through their warehouse, loaded it again and shipped some of it back to British Columbia, where it was sold to farmers after the \$300 per car had been paid for the return freight. Is this economy? Again, we shipped last year to Fort William 100,000 tons of weed seeds from prairie farms. Many of these weed seeds are good feed for stock. They were shipped to Fort William, the freight paid on them, the grain was docked when it got there, so that nothing was paid for the seeds. They were cleaned out, shipped across the line to Minneapolis and manufactured into fillers for stock foods and some of them shipped back to the prairies and sold as medicine for stock. This is poor economy.

It is a matter of considerable satisfaction to be able to note significant and important beginnings in co-operative marketing in Alberta.

EGG CIRCLES

Egg Circles have made more progress in Eastern Canada than in the West because there is more poultry and also because settlement is closer. They have attained great success in Prince Edward Island. There, practically all the eggs are

sold through these circles. This year, however, we have already had eight associations organized in Alberta by Mr. Benson, representative of the Dominion Department of Agriculture. An association is formed in a certain district for the sole purpose of selling eggs. Each member agrees to sell his or her eggs through the association. In some cases, a deposit of \$5 per member is made, which goes to form a fund on which to finance the sales. By this means an advance is made on each shipment. The eggs are sent to the best market and as soon as sold the balance of payment is forwarded to the shipper, less the cost of shipping and handling. In the first place, the eggs are all graded, being sold on grade. The identity of the eggs is preserved until they reach the grader. The person supplying the best grade gets paid for them accordingly, and the person supplying a poor grade is penalized for doing so, instead of everyone sharing in the loss which should belong only to the careless one. Then again, the eggs are sent as soon as possible direct to cold storage. No eggs can be shipped from the farm after they are three or four days old. The whole work is done with a minimum of cost and a maximum of efficiency, because it is done by co-operation and handled by experts who know the trade.

MARKETING WOOL AND PURE-BRED RAMS

Up until three years ago, Alberta wool was selling from 11c. to 14c. per pound and even lower. This year (1916), it was sold at from 30c. to 35c. per pound, and while it must be recognized that special conditions have caused a rise in the market, it is equally clear that the various wool growers' organizations have had a very great influence in steadying and

improving the market. At present there are several wool growers' associations operating in the province, viz., at Edmonton, Calgary, Lethbridge, Vermilion, Pincher Creek and Lacombe. In fact, practically the whole Alberta clip is this year to be disposed of in organized marketing. The membership fee is \$1.00 and each member may ship his wool to his association after each fleece has been properly prepared, tied and sacked. The wool is graded by an expert from the Dominion Government, the weight and grade credited to the proper shipper and then tenders are asked for. The wool is sold on grade entirely, and each person paid for the weight and grade shipped. Several buyers come to one point where the wool is assembled in large quantities and where they compete for the wool and thereby the market price is realized.

Besides disposing of their wool co-operatively, the owners of pure-bred flocks have organized combined sales of rams, which are having a desirable effect in standardizing prices and in making the supplies of pure-bred stock known to people looking for rams. Sales will be held this year at Edmonton, Calgary and Lacombe. The same practice of assembling surplus stock has been carried out for a number of years in the case of bulls. Sales are carried on each spring at Edmonton, Lacombe and Calgary.

GRAIN TRADE ORGANIZED

Most people are familiar with the grain trade. The work of the grain commission which operated under the direction of the Dominion Government in the interests of the grain trade is well known. It exercises very great powers with respect to the control of the trade, not only in the matter of grading, but also in the general handling and movement. Official graders are kept at various points to inspect for dockage and to grade all grain passing through such

points. On account of this organization and because of the possibility of getting a grade on grain, a farmer may pick up a daily paper and learn the quotations on wheat for a certain day, so that he knows exactly what his wheat is worth. The grain trade is really highly organized in the interests of the producer. The Grain Growers' Grain Co. and Farmers' Co-operative Elevator Co., which are farmers' organizations, established and operated for the purpose of marketing, have had a steadying influence on the trade. The representatives of the companies hold places on the chief grain exchanges and handle a large amount of grain. Thus the representative of the producer is in a position to know just how grain is handled to prevent any undue profits being regularly extracted by unscrupulous middlemen.

THE BUTTER BUSINESS

Doubtless many are familiar with the butter trade as carried on in this province. The Department of Agriculture operates a marketing service branch under the direction of Mr. Marker, Dairy Commissioner. All creameries desiring to avail themselves of this service may, by signing an agreement with the Department, have their butter marketed through the Commissioner's office. The butter is shipped direct to the Dairy Commissioner at Calgary, where it is put in cold storage, graded, and may be sold immediately, or held for a better price. The commissioner or one of his staff reports directly to the butter maker on the quality of the butter, advises respecting improvement and even sends out instructors to the factories to consult with the makers respecting improvement in the quality of the output. This system has had a beneficial effect in standardizing the grades and in leading to the production of more and better butter.

TIMOTHY SEED

Late last season it was learned that there was a considerable amount of timothy seed in the province for which there was little sale. As there was a good market in Toronto and Montreal for timothy, several cars of Alberta grown seed were shipped there. The Department hopes to organize the timothy growers of Alberta so that it will be possible for them to market their seed on a good basis. The timothy will be shipped from all parts of the province to the internal elevator at Calgary, where it will be cleaned by modern machinery, officially inspected and graded, carload shipments made up and sent through to Toronto and Montreal, where the marketing will be supervised by a representative of the producers and by an official of the Department of Agriculture, unless arrangements can be made for the agents of Eastern seed houses to purchase at the Alberta internal elevator.

THE MEAT TRADE

The meat trade of Western Canada is perhaps in the worst need of organization from the farmers' standpoint. By its nature it lends

itself to monopoly with the result that the trade is now in the hands of two or three firms and it does not require much argument to convince one that conditions might be improved when we consider the discrepancies in price between the live weight price of hogs and the price of bacon per pound in the retail store. We must endeavour to reach a place where we will have in live stock as we have in grain, fewer middlemen, with a steadier market and, above all, payment on a quality basis.

Finally, let me urge that marketing organizations be not developed too fast. Let them start only where there is a real demand. Let them grow from small proportions as conditions warrant and, by such a method, proper men will be found to man them. Thus a healthy organization will be established on a sound structure. Organization will raise the quality of the product because the goods are sold on a quality basis. It will direct the goods to the proper market, establish channels of trade, make for a steady market and get for the farmer the ultimate dollar for the thing he raises. These are the essential elements in the economy of any commercial enterprise.

BEAUTIFYING SCHOOL GROUNDS

Some of the districts are moving in the matter of beautifying the school grounds. The work done along this line in Shaw School District is worthy of special mention. The levelling and seeding of the grounds and the planting of trees and shrubs have added greatly to their appearance. In some cases much remains to be done. A few hours' work on the fences, a fresh coat of paint on the buildings, the levelling and seeding of the grounds, and the planting of a few trees would work a transformation in the appearance of the school premises.—*Report of Department of Education for Manitoba, 1916.*

SUCCESSFUL INCUBATION

The market value of poultry and eggs, in keeping with the prices of all food-stuffs, renders it of the highest importance that the maximum number of strong chickens be raised in 1917. The poor hatches of 1916 provided, in many cases, valuable lessons on the subject of incubation. In order that these lessons may be brought together for the benefit of all interested in poultry work, the officials in charge of poultry husbandry in a number of the provinces have contributed the following articles on this subject dealing with the following important factors in successful incubation:—

1. The factors that will insure the maximum hatches of strong chicks.
2. The conditions responsible for poor hatches that have not been sufficiently appreciated: —

THE NOVA SCOTIA AGRICULTURAL COLLEGE

BY J. P. LANDRY, PROFESSOR OF POULTRY HUSBANDRY

THE writer has had an experience of over twenty years with different methods of incubating hens' eggs. During some years success came with little effort and during others the best of care did not make the chicks live and grow as would be expected.

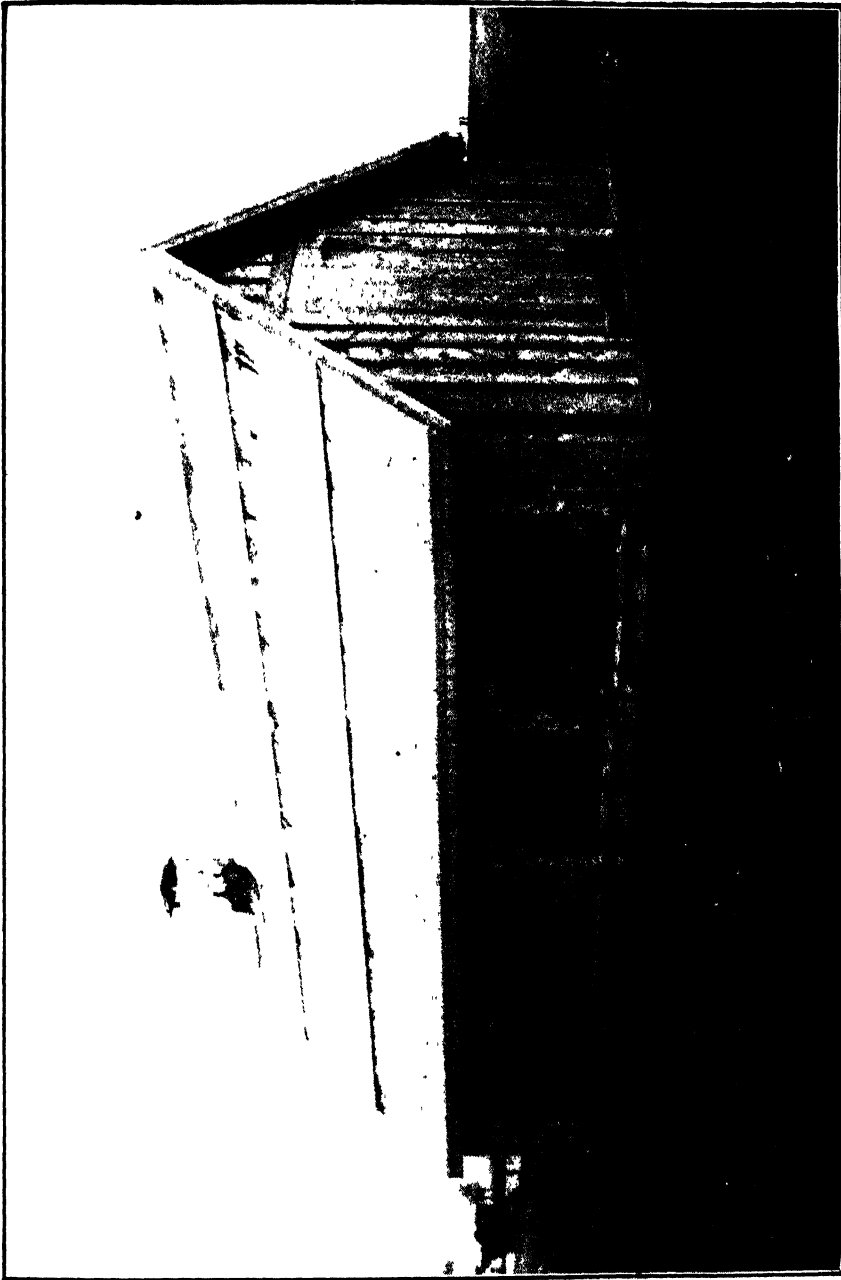
The rules of incubation as laid down by the manufacturers of the incubators will, if followed properly, give a fair percentage of chicks from the strong-germed fertile eggs. These rules should be followed closely in running the incubators and, if success does not follow their use, it is not likely that other methods of handling the incubators will give any better results.

It is not to be expected that an incubator will hatch strong chickens from eggs which have come from stock of low vitality. The all important point in successful incubation is to secure eggs from stock of great vigour and vitality and have them properly hatched. For an ordinary farmer hatching one hundred or less chickens in a season the natural method will prove the most satisfactory. The farmer who raises over one hundred chickens in a season is to all intents and purposes a poultry specialist and, as such, re-

quires special incubating and brooding equipment.

A long and rather discouraging experience has led the writer to discount the use of small brooders holding thirty-five to fifty chickens each, and to adopt the small brooder house plan where flocks of two hundred to five hundred chickens may be kept warm by using oil or coal burning stoves, which heat the room to a temperature of 90 to 100 degrees F. The chickens in the heated room are under the care of the attendant and at a glance one may see if they are comfortable or otherwise. The building illustrated herewith is divided into two rooms, the inner one is heated and as the chickens become old enough they are allowed into the room which is not heated, by an opening in bottom of door. From this second room they are taken and placed in flocks of one hundred and fifty in colony houses 8 feet x 12 feet, which have a yard round the house so as to keep the chickens from straying. When the chickens are twelve weeks old they are allowed free range, but should always be fed at the house where they are kept. In this way they will not roam away from their "home".

It is all important in rearing



BROODER HOUSE USED IN POULTRY DEPARTMENT. AGRICULTURAL COLLEGE, TRURO, NOVA SCOTIA

chickens that the little fellows do not at any time suffer a cold chill or become overheated. All danger of overheating the chickens is removed in the two-roomed brooder house, as the chickens can select the temperature which best suits them, and they are not forced to stay in a heated brooder. The neglect of this item of attention in brooding chickens has caused the loss of more chickens than all other causes. The chickens that take cold chills during the first two weeks in brooders are

bread and egg feed and the chick feed alternately.

Dry bran is provided where the chicks can get it at all times. At the end of two weeks cracked wheat and cracked corn in equal parts with $\frac{1}{2}$ part of coarse oat meal may be fed instead of the chick feed. Any milk or milk curds that the chicks can get to eat will assist their growth. Regular feeding and variety should be followed out in feeding young chickens to get best results. A small quantity of fine beef scrap of good



COLONY HOUSE AND FLOCK OF GROWING CHICKENS

not likely to make fast growth afterwards.

The feeding should not be attempted too soon after hatching. Forty-eight to sixty hours is not too long a time to wait before giving first feed. Water and grit should be provided at all times. First feed should be bread, 8 parts, hard boiled eggs, 3 parts, mixed. This is ground fine, and what will be eaten clean fed on clean boards. Fine clean chick feed is scattered in litter and the chicks are fed the

quality should be provided for the chickens in a box, where they may get at it.

Chickens of healthy and vigorous stock treated in this manner have given very satisfactory results and have not cost for labour as much as where they were attended in small brooders. If larger flocks are to be raised each year, several houses of the type illustrated could be constructed and would be found more satisfactory than a long brooder house located on a permanent foundation.

MACDONALD COLLEGE

BY M. A. JULL, B.S.A., LECTURER AND MANAGER, POULTRY DEPARTMENT

FACTORS INFLUENCING THE FERTILITY OF EGGS

Season.—Usually the earlier the season the lower the fertility and in some parts of Canada poultrymen experience difficulty in securing a good percentage of fertile eggs early in the season.

Breed.—The lighter breeds, Leg-horns, Anconas, etc., average higher in fertility for the season than the heavier breeds.

Age of Stock.—Cockerels and pullets mated together usually yield the largest percentage of fertile eggs, with cockerels mated to yearling hens next, yearling cocks mated to pullets next and cocks mated to hens last. At the same time, the "degree of fertility" of any female varies inconsistently from year to year.

Vitality of stock. The vitality of poultry used for breeding purposes is of prime importance. Without the highest degree of health poultry cannot attain the maximum in fertility. A sick bird should never be used as a breeder.

Mating. The number of fertile eggs produced depends upon the matings during the breeding season, which, in turn, depends to a certain extent, upon the number of males mated to a given number of females. One male mated to a varying number of females up to about fifteen would result in a fairly consistent percentage of fertile eggs. On the other hand, the individuality of the male counts for a good deal. I have known of one male being mated to thirty females and over eighty per cent of the eggs were fertile.

The factor of time between the placing of the male birds in the breeding pen and the saving of eggs for hatching comes into play. A fertile egg may be secured one day after the time of mating a male to a

female, but in the commercial production of fertile eggs about two weeks should elapse from the time the males are placed in the breeding pen. The fertility of eggs remains at a sufficiently high percentage for about two weeks after the males are taken out of the breeding pen.

Inheritance.—Fertility is not an inheritable factor. The eggs of a pullet may run very high in fertility, but as a yearling her eggs may run extremely low and *vice versa*.

Egg Production.—There seems to be no correlation between egg production and fertility; a good winter layer may run high or low in fertility and a poor winter layer may also run high or low in fertility in regard to the number of eggs produced.

Individuality.—The individuality of the female bird is an important factor because each female has a characteristic degree of fertility of her eggs independent, to a large extent, of the character of the male bird with which she is mated.

Management.—The general treatment given the hens affects the number of fertile eggs produced. Sanitation is essential. The fowls should live in comfort, liberally fed on wholesome food and kept in houses which are dry and provide plenty of fresh air. The opinion is prevalent that green bone given to breeding birds affects the fertility, but this has not been established at Macdonald College.

FACTORS INFLUENCING THE HATCHING QUALITY OF EGGS

Season.—Environmental conditions influence the hatching quality of eggs; it seems that the hatching quality is lower very early in the season than during the latter part of March and April. Many fertile eggs are allowed to become so severe-

ly chilled early in the season that the hatching quality is affected.

Breed.—The influence of breed upon hatching quality is most marked between extremes of breed type, such as Leghorns and Brahmas. Between breeds of the same type, such as Plymouth Rocks, Wyandottes and Rhode Island Reds, there is no noticeable difference in regard to the hatching quality.

Age of stock.—Pullets may be as good in the hatching quality of their eggs as hens. On the other hand, great care must be exercised in the selection of mature pullet breeders in order that the vitality of the chicks may not be impaired.

Vitality of stock.—The vitality of the breeders has a marked influence upon the hatching quality of the eggs; breeding birds lacking in constitutional vigour are bound to produce eggs low in hatching quality.

Fertility.—While the number of eggs hatched naturally depends upon the number of fertile eggs produced, yet there is a very slight correlation between fertility and hatching quality. In general the hen whose eggs run high in fertility will also run high in hatching quality, although there are many high producers which run extremely low in hatching quality in spite of high fertility.

Inheritance.—There is a definite correlation between the percentage of fertile eggs hatched in the pullet year and in the second breeding year. That is, the hatching quality of eggs is an inherited character. This applies to both the male and female lines.

Egg production.—There is a definite correlation between winter egg production and the percentage of fertile eggs hatched during the subsequent breeding season. It seems that the higher the winter egg production of a female the lower will be the percentage of her fertile eggs to hatch. Conversely, the lower the winter egg production of a female

the higher will be the percentage of her fertile eggs to hatch. A new phase enters into the general breeding problem; there must be developed heavy winter producers with good hatching quality of their eggs.

Individuality.—Trap-nesting the breeders is advisable because all birds possessing poor hatching quality of their eggs can be selected.

Management.—The management of the breeding stock has a great deal to do with hatching quality. Housing conditions, particularly, affect the hatching quality; dry houses, abundantly supplied with fresh air, are conducive to a high hatching quality.

FACTORS AFFECTING THE KEEPING QUALITY OF HATCHING EGGS

Age. In general, the sooner that eggs are incubated after being laid the better. The hatchability remains fairly constant in eggs held up to two weeks.

Temperature.—Practical experience suggests that hatching eggs should be held in a temperature of from 55° to 65° F.

Place.—The best place in which to keep hatching eggs is a cool, well-ventilated cellar.

Position of eggs.—While being held the eggs should be kept on their side and turned daily.

Washing eggs.—It is not advisable to wash dirty hatching eggs since washing seems to affect the hatching quality.

FACTORS OF INCUBATION

It is impossible here to consider the relative efficiency of hens as compared with incubators in the incubation of eggs. Most of the factors mentioned below do not apply with nearly as great force in natural as in artificial incubation.

Temperature.—The physiologic zero of a hen's egg has been found to be between 68° and 71° F. The op-

timum average temperature for the egg has been found to be 100° the first week, 101° the second week and 102° the third week of the incubation period; this implies that the optimum average temperature for the incubator chamber is 102° to 103° F. for the first half and 103° to 104° for the second half of the incubation period.

Moisture. -Experimental results throughout the country prove, in general, the necessity for supplying moisture to the incubator chamber. Macdonald College has found that a relative humidity of 55 to 60 per cent is advisable in all machines.

Ventilation. -The amount of ventilation necessary in an incubating chamber is correlated with the moisture supply and with the carbon-dioxide-content. Since a relative humidity is necessary and since the amount of carbon dioxide in the egg chamber is not a limiting factor in incubation it seems advisable to keep the incubator fairly well closed during the forepart of the incubation period, having the ventilators full open the last few days.

Position of eggs. -While on the egg-tray the eggs should lie on their sides or obliquely.

Turning of eggs. After the second day of incubation the eggs should be turned twice daily.

Cooling of eggs. -The cooling of the eggs during the incubation period involves the airing of the eggs at the same time and it is probable that both cooling and airing do good up to certain limits.

Disinfection. -The incubator should be disinfected thoroughly before and after every hatch.

THE CONDITIONS RESPONSIBLE FOR POOR HATCHES THAT HAVE NOT BEEN APPRECIATED SUFFICIENTLY

The conditions which were responsible for the poor hatches, in general, in 1916, are involved in the numerous factors enumerated above.

Since a close study of the factors involved in successful incubation will enable one to appreciate the importance of those conditions chiefly responsible for poor hatches, an enumeration of those conditions would be mere tautology. Nevertheless, it may be well to emphasize the more responsible conditions, which have not been appreciated sufficiently, but which deserve the most careful attention of every breeder.

Throughout the province of Quebec enough attention is not given to the selection of the breeders to insure the maintenance of constitutional vigour. It is a rule of good practice never to breed from a bird which has been diseased. Furthermore, many farmers in Quebec use undersized and immature pullets as breeders with the result that the constitutional vigour and productivity of the succeeding generations is impaired. It is a serious fallacy to breed from immature stock.

The number of chickens reared in Quebec last year was not controlled entirely by conditions of incubation because conditions of rearing were probably more disastrous. It is true that in many cases fertility was low, owing largely to local conditions; at Macdonald College the fertility ran much the same as in previous years except that one pen ran very low and one pen ran higher than usual - differences due entirely to local conditions. One very important factor, however, is the manner in which hatching eggs are often gathered. In Quebec, the season is rather cold during the fore part of the breeding season and many eggs are allowed to become chilled before being gathered. Such neglect causes the loss of thousands of eggs and the production of thousands of weak chicks. The moral is that eggs for hatching must be gathered frequently during cold weather.

In general, sufficient care is not taken in the selection of eggs for hatching. All eggs for hatching should be examined carefully to de-

termine, as far as possible, whether or not they will produce chicks, although the only method of telling whether or not an egg is fertile is by incubating it. Eggs of proper shape and size should be selected; furthermore, the eggs should be sound in shell. The number of chicks reared in proportion to the eggs set is one of the best tests of a good poultryman.

The general management of the flock, including particularly the meth-

od of housing and sanitary measures, have much to do with the hatching problem. Many Quebec farmers do not give attention enough to the details, which are so important.

Aside from the general undesirable conditions which prevailed last year, which, however, provided no outstanding exception in comparison with other years, there was one factor, the late season, which was responsible, in a large measure, for the poor hatches.

THE ONTARIO AGRICULTURAL COLLEGE

BY W. R. GRAHAM, B.S.A., PROFESSOR OF POULTRY HUSBANDRY

THE first factor is the production of good hatchable eggs, and is probably the most important factor; that is to say the finest kind of eggs will hatch pretty fair chicks under a very wide range of conditions. However, it has not been clearly demonstrated, but that the general hatching power of eggs is gradually decreasing. The next requirement is first class incubators and then the room in which the machines are operated should have an abundance of fresh air and both the room and the machine should be clean and I think for best results disinfected after each hatch, or, at least, the machine should be. Perhaps the other additional factor would be cleanliness on the part of the operator in regard to his hands in particular, and the keeping of cans or barrels or tins of coal-oil or any other substance of strong odour or decaying material out of the incubator house.

It has been pretty well demonstrated now that the hatching power of eggs is inherited. While we must admit that environmental conditions have a great deal to do with the hatching power of eggs, they are not the only conditions, and probably if more attention was paid to the hatching power ancestry of particularly the males who represent half the flock

the general hatches might at least hold their own or increase.

In regard to the environmental conditions—the excessive use of meat foods to force egg production and in many instances the lack of exercise, fresh air, green food, and the breeding from immature stock are causes of poor eggs for hatching purposes. With weather such as we are getting at present the general vitality of the stock is more or less depleted as far as producing eggs for hatching is concerned; that is, it is a common experience that February eggs are much harder to hatch than May eggs. Perhaps we do not fully appreciate the value of having poultry houses not only well ventilated, but dry and comfortable, and the necessity of exercise in order to have the bird physically fit, and the further factor of the supplying of some kind of green food or vegetable food for the general health of the bird or toning up the system.

In regard to environmental conditions with the incubator, many machines are not kept sufficiently clean and there is a tendency among experienced operators to allow too much variation in temperature; that is experience usually indicates that a chicken can be hatched under a wide range of temperature, and furthermore, I think closely tabulated

experience would indicate that variations of more than one and one-half degrees in temperature in the incubator, that is above or below $102\frac{1}{2}$ degrees are usually conditions which affect the living power of the chick perhaps more than the hatch. Furthermore, many machines are operated with unreliable thermometers, and in many instances dirty eggs are set and the operator's hands at the time of turning the eggs are not any cleaner than they should be. Absolute cleanliness of the machine and of the operator's hands, and the supplying of an abundance of fresh air in the machine and room are

big factors. The setting of dirty eggs and eggs of all shapes and sizes, which is sometimes done simply to fill up the machine, are not good practice.

The success or failure of this branch of the business, as well as almost any other branch, depends upon doing the work at hand to the best of your ability. One's success, I think, in this business depends largely upon knowing how to do the work and then doing it at the proper time and, generally speaking, maximum efficiency spells greatest success, and a little lack of efficiency means failure.

THE MANITOBA AGRICULTURAL COLLEGE

BY M. C. HERNER, B.S.A., PROFESSOR OF POULTRY HUSBANDRY

THE conditions responsible for poor hatches may vary in character depending on the method of incubation followed. In artificial incubation, temperature, ventilation and moisture are the three prime requisites, whereas in the natural method these are all as near perfect as it is possible to get them. Poor hatches with hens must, therefore, be attributed to some other factors which do not affect the eggs so directly. Generally, if there are poor hatches with hens the eggs from the same stock will hatch infinitely worse with incubators. When both methods of incubation give poor hatches as in the spring of 1916, then we must look for some unusual conditions which affected the stock and caused a deterioration in the fertility and hatching power of the eggs produced. Last season poor hatches were reported from everywhere. Farmers and breeders alike reported poor hatches. Both incubators and hens were more or less a failure. It was not a question of the method of incubation because both showed poor hatches, nor was it a question of feeding, because under all systems and methods of feeding results were

more or less the same; nor could housing have been responsible for it.

As far as my observation goes climatic conditions had more to do with poor hatches in this part of the country last season than anything else. The long continued cold winter and consequent close confinement, artificial conditions, and lack of green food apparently had their effects on the general vigour and vitality of the flocks. During the natural laying and breeding season is the period of highest fertility and greatest hatching power. This was delayed; in fact, ideal conditions never existed at all last season. Even after spring came it remained cool and damp, and not at all favourable for producing good hatches. The season of best hatches is usually preceded by a comparatively short open winter, and an early warm spring. Last season we had exactly the opposite and poor hatches followed.

If poor hatches had been confined to certain local areas or isolated cases then they might be attributed to feeding or housing, but when they are general throughout the country we can only attribute them to cli-

matic conditions. The effects of these conditions were far more pronounced when hatching with incubators than with hens and far poorer results were obtained.

Some foods have a direct influence on the hatching of eggs. Feeding some breeds heavily on meat foods, or soft mashes, will decrease the hatching. Lack of light, poorly ventilated and damp poultry houses may also have their effects on the hatches. While any of these factors may singly, or in combination, affect the hatches, still, when conditions are universal as they were last season we can hardly blame any of these.

While the factors which influenced the hatches of 1916 are more or less out of our control, still the effects are so far reaching that steps should be taken by the farmers and breeders to safeguard against a similar repetition. In poultry work we usually figure that whatever is the cause of a poor hatch will also influence or affect those chickens that do hatch. In the past year's poultry work we had a remarkably good example of it. Never before have we seen such large numbers of weak constitution chickens as we saw and handled last fall and winter. Dealers on every hand complained of the condition of the chickens. True, the growing season was short, and there was a shortage of feed, but the chickens

had not the foundation to start with. They were hatched weak; they lacked the "get"; they hadn't the "pep". Our fattening work this fall gives us ample proof of this.

A bigger problem is confronting the farmers of this country to-day than they have ever had in their poultry work. Never before was there such an urgent need of selecting strong, vigorous and healthy birds to breed from. There are thousands upon thousands of immature, and weak constitution pullets in the western farm flocks today that should not be used for breeding purposes this season. Indiscriminate breeding and inbreeding will mean a gradually lowering of vigour and vitality of the flock as a whole. Later on may follow the ravages of roup and tuberculosis.

These points may not be so important in Eastern Canada, but in the western country with its strenuous winters, we cannot pay too much attention to selecting stronger and more vigorous stock for breeding purposes. In the milder sections recovery from one season's poor hatching may be easier and more rapid, but in the colder sections recovery is harder and slower, and therefore more care and attention should be given to selection and breeding.

SASKATCHEWAN

BY R. K. BAKER, B.A., PROFESSOR OF POULTRY HUSBANDRY, COLLEGE OF AGRICULTURE

WHETHER broody hens or incubators are employed the requirements for successful incubation may be summarized as follows:—

1. Strongly fertile eggs from healthy vigorous breeding stock (the fresher the eggs when set, the better the hatch is likely to be).

2. A dependable source of heat sufficient to maintain these eggs at a temperature of 102° to 104° F. throughout the incubation period.

3. Enough ventilation to supply the developing chicks with oxygen and to remove what carbon-dioxide is given off by them (if the chicks are to avail themselves of this ventilation the shells of the eggs must be kept clean).

4. Some moisture must be provided to prevent too rapid evaporation of the contents of the eggs.

When an incubator is purchased, complete instructions for setting it up, for regulating temperature, ventilation and moisture and for turn-

ing and testing the eggs, accompany each machine.

It is generally conceded that the fertility of the eggs and the vitality of the germs in them are the most important factors in incubation and are the ones over which we have least direct control.

Conditions favourable to the development of the chicks in the eggs can be maintained with little variation, whether under hens, or in incubators in different climates, at different altitudes and from season to season.

If during the season most of the hatches are good, the partial failure of a single setting would lead us to blame the hen or the incubator operator, but if the average hatch from a number of hens whose nests have been made on the ground should be unusually poor, or should several incubators which have been successfully operated in the same room in former years, fail to give fair hatches, we would have grounds for supposing that the eggs were at fault and would investigate the condition of the breeding stock.

When a new settler starts with a few fowls, gives them good care and allows them free range from the time the snow melts in spring, fertility and vitality are usually at their best and excellent hatches are the rule. The growth made by chicks under such conditions is remarkable. The homesteader's only trouble is to protect the birds from their natural enemies, especially the coyote.

If after three or four years however, poultry are still kept in the same house and allowed to range over the same land and if no precautions have been taken to keep the house in a sanitary condition and to cultivate the land, the stock will not be so vigorous, their eggs will not hatch so well, a smaller proportion of the chicks will live to maturity and their development will be slow.

During the spring of 1916 poultry

raisers from various parts of the province reported hatches which were below normal. Some few complained of almost total failures. As the hatches at the College were not up to our former average and as similar reports came from some of the other provinces, we believed these conditions to be more or less general and ascribed them to a long series of adverse weather conditions. The summer and fall of 1915 were cold and wet, this prevented the young stock from attaining full development. The winter was unusually long and severe, and the spring of 1916 was cold and stormy, making it impossible for the stock to get out on the range or to regain its vitality till quite late in the season.

A five weeks' trip through the province made during June and July with the Better Farming Train enabled the writer to visit over fifty districts and to meet a few of the most interested poultry raisers at each stop. Most of these reported satisfactory hatches quite up to the average of former seasons. Where partial failures were mentioned a little enquiry usually showed them to be traceable to a run-out condition of the stock, the result of keeping fowls for a number of years on the same ground, or to continued inbreeding without selection, or to the use of low price incubators and brooders.

In many districts a few poultrymen were having better success than ever before. These were usually raising their first crop of poultry on a new farm, or had built a new poultry house on ground not previously ranged over by poultry, or had purchased some fresh breeding stock.

Very little mention was made of disease among poultry.

We have no way of finding out exactly how much poultry was marketed by Saskatchewan poultry raisers last year. Most of the produce of the eastern part of the province went to Winnipeg. From the western part many shipments were made to

Edmonton and Calgary. The local supplies of dressed poultry in the cities and towns seemed sufficient; while between 150,000 and 200,000 pounds of live poultry are said to have been received by the Government co-operative marketing stations and by packing firms in Regina

and Saskatoon.

Lacking complete and definite information it would be impossible to decide whether the number of head of poultry hatched and reared in Saskatchewan last year was above or below the average for the two preceding years.

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT, DEPARTMENT OF AGRICULTURE

AMONG poultrymen the "hatchability" of eggs or power of reproduction is an important annual consideration owing to the large number of eggs that fail to hatch or that produce weaklings and thereby entail disappointment and loss. These abnormal losses are sometimes attributed to heavy egg production, a factor in hens that most poultry raisers are not overburdened with. The losses frequently occur in eggs from hens somewhat low in egg production.

Breeding from pullets also receives its share of condemnation. Their failure to produce hatchable eggs, however, has also been disproven.

Faulty incubation is, perhaps, more frequently blamed for the failures, and many experiments have been made in attempting to remedy the trouble by giving special attention to such matters as radiation, diffusion, relative humidity, moisture, ventilation, manipulation of air cells, etc., and still unsatisfactory results follow from year to year. From actual experience, the writer is satisfied that we require to look elsewhere for a remedy, because good hatches have been obtained from time to time when all rules and regulations in incubation have been violated.

When hatching the eggs of wild fowls, I have found that practically every egg hatched a good, strong chick. Should a weakling hatch, it invariably dies, thus fulfilling one

of nature's most effective laws in the propagation of the species, "the survival of the fittest". It is, therefore, necessary for the poultrymen to apply nature's law in the breeding of our domestic fowls. Too often, there is a desire to make the unfit survive, especially when the bird has strong scoring points or good exhibition qualities. The earnest attention of the breeder should be given to the production of hatchable eggs and it is, therefore, necessary to give the most careful consideration to every factor that has a direct influence on making the eggs. One of the first steps to successful incubation is the elimination from the breeding pen of all birds immature or defective in constitution and vitality, or those possessing any other undesirable traits that have a direct influence on incubation. A large number of failures may be traced to the condition of the hen house rather than an incubating room. The birds should be fed and allowed to live out-of-doors as much as weather conditions will permit. They will take advantage of outdoor conditions even in severe weather, providing they have clean litter to scratch in.

Light, ventilation and sanitary conditions have a very decided effect on incubation. It is scarcely necessary to mention the immense value of sunlight, whereas poor light, lack of ventilation and unsanitary conditions are powerful allies in producing failures. Lack of ventilation

means frosty walls and roof—cold storage conditions—in cold weather, moisture and dampness when mild weather follows. Unless the hen house is kept clean, the moisture and dampness greatly increase those unsanitary conditions. Good sanitary conditions do not mean simply removing the droppings occasionally and whitewashing the walls once a year. It means the removal of the droppings daily, disinfecting the house frequently, and the removal of, and replacing, the earth floor as often as it becomes foul, with clean, dry straw for nests and litter. These precautions and the feeding of clean wholesome foods are all very essential. A well-balanced ration is necessary, proportioned so as to produce a well-balanced egg, capable of giving the chick a normal growth during the process of incubation.

It must be remembered that by the application of incubating heat the egg must necessarily produce the chick. Should the egg be deficient in any of the necessary elements the chick will naturally be lacking to the same extent. Take, for instance, the application of moisture; instead of applying the moisture to the egg during incubation the moisture should be within the egg, placed there by feeding the hens the necessary succulent foods.

The care of the egg for incubation also requires attention. Incubation commences as soon as fertilization takes place and continues until the egg is laid. Incubation should then be arrested until the egg is again

placed under incubating heat. Should the egg be held in a sufficiently warm place a slow development of the embryo continues that weakens the germ life so that it will not respond properly when again placed under normal incubating heat. This is clearly illustrated when incubating an egg that is taken warm from the nest and another egg that has been held for a few days, even though held under ideal conditions, the former egg frequently hatching from ten to fifteen hours earlier.

In dealing with this subject I have mentioned only the general principles involved. It is necessary that the poultry-keeper, desiring the greatest possible success, should become familiar with the care and management of poultry in every respect, giving special attention to what might be considered minor details that often in incubation prove to be major ones.

The general factors in incubation may be summed up as follows:

The selection of breeding stock strong in vitality and constitution; the consideration of light, ventilation and sanitary conditions; outdoor life for the birds; the feeding of clean, wholesome foods necessary to the production of eggs capable of developing normal chicks; the setting of eggs promptly after being laid; the holding of eggs at a reasonably low temperature in order to arrest embryo development while being held for incubation, and the proper care of the chick from the time it is hatched until it reaches maturity.

QUEBEC

SKIMMING STATIONS

BY ALEXANDRE DION, SPECIAL OFFICER, DAIRY DIVISION, DEPARTMENT OF AGRICULTURE

THE Quebec Dairy Act, as originally passed, contained no provisions for skimming stations, and these stations were not, therefore, under Government control; their construction was not subject to regulations, there was no compulsory inspection and the men in charge did not need to be qualified. But as these establishments received cream to be made into butter at another factory, there was no good reason why they should not be inspected as well as all other factories of dairy produce, and the Legislature was requested by the Dairy Division to amend the law so as to put these stations on the same footing as the creameries. This was done by an amendment adopted at the last session, substituting the following paragraph to the second paragraph of section 2031b.

"The expression 'butter factory' means any establishment receiving milk or cream supplied by at least three different herds of cows, belonging to at least three persons, either for the sale, as such, of this milk or cream, or for their manufacture into butter, in whole, or in part, in this establishment or elsewhere."

Therefore, all skimming stations being now considered as creameries under the law, they must, in future, be properly equipped and kept under proper sanitary conditions in order to be registered, that is to say to secure the license stipulated in section 2031d; they must also have a qualified buttermaker, according to section 2031f, and contribute the

sum of \$15 per year, the same as all other factories of dairy produce, as under section 2031o.

It is believed that as a result of this amendment the number of skimming stations will be reduced and the producers will be encouraged to organize themselves into co-operative associations. It is also hoped that these skimming stations, being under efficient control, shall produce a high grade cream, which will not lower the quality of the butter made at the factory, thereby securing high grade quality and uniformity over the whole of the province. If this departure enables us to make further progress in dairying, as we have a right to expect, this shall be sufficient reward for our efforts.

The need for this measure had been felt for a long time; its adoption had been urged by a large number of factory men who found it ruinous to compete against skimming stations, and by many patrons who are opposed to these stations because the cream separated in these establishments is not always delivered in as good a condition as it should be at the butter factory. The owners of the skimming stations themselves will doubtless realize the advantage of this law, which, although putting them under new obligations, gives them the full advantage of the inspection system, and enables them to manufacture a high class product, for their advantage, and for that of their patrons.

BACON HOG BREEDING COMPETITIONS

BY F. N. SAVOIE, B.S.A., SECRETARY, DEPARTMENT OF AGRICULTURE, QUEBEC

UNTIL 1915, breeding competitions in the province of Quebec were limited to the local fairs, organized by the various agricultural associations, and to the district exhibitions. Animals entered at these contests are judged according to their value, as types of the class to which they belong.

Hogs being now one of the most valuable classes of live stock, it was important that steps should be taken to encourage their breeding. Hog breeding is a necessary complement of the dairy industry, as it permits the profitable utilization of dairy by-products. Among the races of pigs that are the best adapted to the conditions of agriculture in our province, those of the bacon type are the most profitable.

In order to encourage the bacon industry and to interest farmers' sons in such, it was decided last year by the Department of Agriculture to employ part of the funds provided under the provisions of THE AGRICULTURAL INSTRUCTION ACT for the organization of bacon hog feeding competitions.

REGULATIONS

The following conditions were set

for farmers' sons who desired to take part in this contest.

1. The competition is open to all farmers' sons, aged 18 years or under.
2. Application for entries to be made on special forms, provided by the Quebec Department of Agriculture, and before the 31st of May, 1916.
3. Each competitor to feed two or several pigs, but only two of these to be shown.
4. Pigs under test to be weaned before the age of six weeks.
5. Each competitor to make his own application, fill out the form and have it countersigned by his parents or tutors.
6. No restriction is made as to race or feed.
7. Two months before weaning, the pigs shall be inspected and marked by a representative of the Department of Agriculture.
8. The judges for the competition are appointed by the Quebec Department of Agriculture.
9. Prizes shall be granted to the competitors whose pigs shall come the nearest to the following description:—
"Pigs suitable for the bacon export trade as regards type, appearance and finish."
10. An exhibition of pigs entered in the competition shall be held in the fall, on a date to be arranged.

The following prizes were offered to the competitors whose hogs are best suited for the production of bacon:

NUMBER OF COMPETITORS	Number of Prizes	Amount of Each Prize
1 to 3	1	\$6
4 to 5	2	1-\$6, 2-\$5
6 to 7	3	1-\$6, 2-\$5, 3-\$4
8 to 9	4	1-\$6, 2-\$5, 3-\$4, 4-\$3
10 to 11	5	1-\$6, 2-\$5, 3-\$4, 4-\$3, 5-\$2
12 to 15	6	1-\$6, 2-\$5, 3-\$4, 4-\$3, 5-\$2, 6-\$1

When there are twenty competitors or more, five additional prizes are granted, if pigs shown score at least 50 per cent of the points. No

prize is granted to pigs receiving less than 50 per cent of the points.

The competitors were visited during the summer by officers of the

Department who marked the pigs under test by fixing a number to the ear of each pig.

In October, a series of fairs was planned in two sections, one for the counties of Eastern Quebec and the other for the counties between Quebec and Montreal and west of Montreal. Each series of fairs was judged by two experts, appointed by the provincial Department of Agriculture, with the help of the following scale of points:

1. General appearance (race, good showing)..... 10
2. Weight (required weight, 200 lb.)... 20
3. Head (strong, not too large, well shaped)..... 2
4. Neck (average length, not too thick, not too curved). 2
5. Back (straight, of uniform width, with well sprung ribs) 8
6. Sides (straight, of good thickness).. 8

7. Length	8
8. Depth.....	6
9. Shoulders (light, smooth and compact)	4
10. Ham (well fleshed, tapering to the base)	8
11. Frame.	4
12. Finish (well fleshed, without excess of fat, flesh firm) .	20
Total.	100

NUMBER OF COMPETITIONS

To ensure the success of these competitions, they were held in the counties of the province where they could be most easily controlled. Competitors were recruited by the District Representatives, the schools of agriculture and a few farmers' clubs.

The following table shows the territory covered:

COUNTY	Number of Competitors	Number of Prizes Given	Amount Paid in Prizes
Rimouski	5	5	\$20
Kamouraska	7	5	20
Bellechasse.....	10	8	23
Dorchester (Ste-Rose) ..	6	6	20
Dorchester (Ste-Héné ne)	5	5	19
Beauce...	3	3	12
Megantic	2	2	11
Arthabaska	1	1	6
Montmorency (Ile d'Orléans)	7	7	22
Montmorency East	2	2	11
Lake St. John	6	4	18
Chicoutimi	1	1	6
Portneuf	14	6	21
Champlain.	8	6	20
L'Assomption	4	2	11
Chateauguay	2	2	11
Shefford and Brome	6	5	17
Rouville.	10	10	25
Iberville	4	2	11
Yamaska	3	2	11
Drummond	26	26	53.50
Bagot... ..	12	12	27
Two-Mountains	2	1	6
Labelle	4	3	12
Totals.	150	126	\$413.50

All animals were judged by means of the scale of points and the judges were instructed to fill in a card for each competitor. In various places the bad condition of the roads

prevented competitors from bringing their pigs to the fair. By the express recommendation of the judges, the Minister of Agriculture granted a special prize of one dollar

to all exhibitors who had not received a prize, but who had taken the trouble to bring their pigs to the fair and who had obtained over half of the total points.

RESULTS

The first and most important result of these competitions was to show the farmers the type of hog suitable for the production of bacon. Many exhibitors who expected to receive a prize for their big pigs, short and fat, were disappointed.

Whenever possible, the judges

went to see the owners of breeding hogs and criticized the qualities and defects of these animals from a bacon point of view, in the presence of their owners.

The Provincial Department of Agriculture intends to continue as much as possible this competition scheme, and to direct more and more the breeders of the province towards the breeding of the type of bacon hog. Various plans are now under consideration which should greatly help the farmers who desire to improve their methods of breeding.

STANDING CROP COMPETITIONS

BY F. N. SAVOIE, B.S.A., SECRETARY, DEPARTMENT OF AGRICULTURE, QUEBEC

SINCE 1908, standing crop competitions have been organized by the Quebec Department of Agriculture, with the help of the Dominion Department, through the medium of the provincial agricultural associations. The development of this movement has been very encouraging, as may be gathered from the following figures:

In 1908 there were 18 competitions and 171 competitors.

In 1916, there were 83 competitions and 1,300 competitors.

OBJECT OF THE COMPETITION

1. To encourage competitors to save high class seed grain, viz.: -
 - (a) Seed from pure varieties.
 - (b) Clean and selected seed, producing uniform and strong plants, with healthy and rigid stems.
 - (c) High yielding seed.
2. To show the competitors the importance of sowing the best seed on a special plot, well prepared, and of harvesting this plot separately.
3. To show the advantage of well cultivated crops exempt from weeds.

The competitions organized in 1916 included standard farm crops, such as oats, wheat, corn, timothy, barley, potatoes and clover. The number of competitors and the area

entered in the competition for each crop are as follow:

REGULATIONS

	Competitors	Acres
Oats	102	2,106
Wheat	316	948
Corn	97	281
Timothy	9	9
Barley	5	15
Potatoes	36	36
Clover	64	192

1. Every agricultural association in the province may hold one of these competitions yearly.

2. Each competition is limited to one crop, selected by the association, and this must be the most important crop of the district.

3. The entries must consist of a plot of not less than three acres for oats, wheat, corn and barley, and at least one acre for timothy, potatoes and clover.

4. Competition is limited to the members of the agricultural associations, and each association is entitled to only one competition, the number of entries for which must not exceed 25.

5. Associations desiring to hold one of these competitions must give notice to this effect to the Secretary of the Council of Agriculture before the 1st of May.

6. The list of competitors or entries must be forwarded to the Secretary of the Council of Agriculture before July 1st.

7. Associations must charge for each entry a fee not under 25 cents and not over \$1.00.

The list of prizes is as follows:—

1st, \$20; 2nd, \$15; 3rd, \$12; 4th, \$10; 5th, \$8; 6th, \$6; 7th, \$4.

If the number of competitors is less than ten, the prizes are as follows:—

1st, \$10; 2nd, \$8; 3rd, \$6; 4th, \$4; 5th, \$2; 6th, \$1.

Two-thirds of the amount paid in prizes are contributed by the Dominion Department of Agriculture, thus on a total of \$75 in prizes, \$50 are paid by the Dominion Department and \$25 by the Provincial Department.

Expenses and salaries of the judges are paid by the provincial Department of Agriculture.

Each competition is judged by one expert, according to the official scales of points of the Dominion Department and judges may grant prizes only to the plots which have scored a sufficient number of points.

The receipts from entry fees are divided between the competitors having obtained a prize.

The secretary of each association or competition must notify the Secretary of the Council of Agriculture at least fifteen days ahead of the date at which the plots should be inspected by the judges.

GENERAL RESULTS

Standing crop competitions have greatly helped in improving the quality of seed in the province of Quebec. This improvement may be noted from year to year at the seed grain exhibitions held in Quebec each winter, and at the local fairs held each year by the different associations.

The judges' remarks at each competition emphasize the fact that the best seed is produced on the farm. Farmers, who produce their own seed and select it carefully, obtain far better results than those who purchase their seed.

These competitions have also shown the importance of using high grade seed and the necessity of fertilizing and preparing the soil thoroughly. A great deal remains to be done in this direction, but experience has shown that these competitions are one of the best schemes that could be devised to create a healthy emulation, not only among the competitors, but also among their neighbours, and when a farmer feels enthusiastic about his work he soon starts to improve.

NOTES

BY E. BELANGER, JOURNAL D'AGRICULTURE

A circular signed by the Hon. J. E. Caron, Minister of Agriculture, and announcing a new "Thrift and Production" campaign has been sent to the parish priests of the province. The object is to stimulate agricultural production and encourage the practice of thrift. The motto is "Production to the utmost."

the greatest success. At many places the attendance has been from 400 to 500.

The four clover threshers, put at the disposal of farmers by the Department of Agriculture this winter, have already been working at more than twenty-five places and they have threshed over 55,000 pounds of seed. This method inaugurated four years ago, has succeeded beyond all expectations. Numerous exhibits of clover seed are always shown at all our seed

The agricultural short courses given by two delegations of official lecturers and professors from the agricultural colleges are meeting with

fairs now, whilst four years ago, this seed was exhibited only by seedsmen.

Mr. Michel Bélanger, a graduate of the agricultural college of Ste-Anne de la Pocatière, has been appointed district representative for Chicoutimi and Lake St. John.

Sanitary stables competitions will be arranged for in all districts where a District Representative of the De-

Situation and exposition.	maximum 5	obtained
Area and cubic space per head.	" 15	"
Ventilation	" 15	"
Lighting	" 10	"
Floor (a) easily kept clean		
(b) impervious to liquid manure	" 25	"
Methods of watering and quality of the water	10	"
Fittings (a) manger, stanchions		
(b) milk room	10	"
Conveniences	5	"
Maintenance (whitewashing and cleanliness)	5	"
	<hr/> 100	

To insure the success of the campaign for "Whole Wheat Bread", the secretary of the Department of Agriculture has sent the following list of questions to all parish priests in the province:

Parish

How many flour mills are there in your parish?

How many stone mills?

Mills importing western wheat for grinding into flour?

Important meetings of secretaries and presidents of agricultural clubs and agricultural associations have been held in two districts of the province. These officers were urged to do everything in their power to have their associations work solely towards one purpose; an increase in agricultural production. Plans were adopted. The duties of the officers of such associations were defined and explained by lecturers.

partment of Agriculture is located, and when a request to this effect is made by a farmers' club. The Representatives will visit the competitors during the summer and make suggestions towards improving the stable and he will visit the competitors again in the fall when, with the help of an officer of the Department of Agriculture, he will judge the stables and divide a grant of \$25 according to the score.

The stables will be scored on the following basis:

The work of organizing horticultural societies is being actively proceeded with. The number of members of societies already in existence is rapidly increasing. The co-operative purchase of seed, trees, shrubs bush fruit trees and ornamental shrubs, spraying pumps and other spraying apparatus, hoes, drills, equipment used for the preserving and canning of fruit and vegetables, has greatly helped this movement.

Spray pumps used in orchards are repaired free of charge by an instructor of the Horticultural Division. One hundred and six horticultural lectures were given during January and February.

A working programme for school gardens has been outlined by the Horticultural Division. Circulars 21 and 22 on "How to increase the horticultural production" are distributed by the Division.

ONTARIO

LAND SETTLEMENT FOR RETURNED SOLDIERS

THE province of Ontario, through the Department of Lands, Forests and Mines, has completed arrangements for providing soldiers who have served in the British forces, an opportunity of securing homes for themselves upon the land in New Ontario under the following terms:

1. All soldiers who wish to go upon the land, and are desirous of obtaining some practical instruction in farming, and learning something of the conditions in Northern Ontario, will be sent to an agricultural training depot now being established on the Government Experimental Farm at Monteith.

2. At this depot they will be provided with comfortable living accommodation and board during their period of instruction.

3. The institution will be under the direction of competent men who have a practical knowledge of agricultural methods, and particularly the conditions and needs in Northern Ontario.

4. As soon as a sufficient number of men have accumulated at the institution whom the superintendent is satisfied know sufficient of farming requirements to enable them to succeed as settlers, a farm colony will be established along the line of railway, to which these men will be moved.

5. The colony will be in charge of a competent superintendent, under whom the men will proceed to do whatever clearing may be necessary, erect the necessary buildings, and do such other work as may be essential to the establishment of a central community. The men will be housed and cared for in the central community, and their labours will be directed to clearing and preparing for cultivation the land of the colony.

6. Farms containing not more than 80 acres will be laid out in such manner as to bring the different farm houses as close together as possible. The work of the men will be directed to clearing on the front of each farm an area of 10 acres.

7. As soon as a soldier desires to go upon a farm and work for himself, an 80-acre lot with a 10-acre clearing will be allotted to him. He will be supplied with the necessary machinery and tools, and such cattle, pigs, poultry, etc., as competent authority may determine, up to the value of \$500.

8. The 80 acres, with 10 acres of clearing, will be given the settler free of charge.

9. For each day's work that is done from the time he enters the training school at Monteith until he goes upon his clearing, he will be paid a reasonable wage.

10. An advance up to \$500 will be made to cover the cost of stock, implements, equipment, and any assistance in building that may be given, for which a lien will be taken against the settler's holding and chattels.

11. The lien will be repayable in 20 years, at 6 per cent, but no payment on account of either principal or interest shall be required until after the expiration of three years.

12. At the expiration of five years from the settler locating upon his land, and upon the due performance of certain conditions in the meantime, he will be entitled to receive a patent from the Crown.

13. The community system will apply with regard to the supplying of horses and other stock and implements.

14. An ample supply of these will be kept at headquarters, for the use of the settlers, upon generous terms.

15. The co-operative method will obtain in the carrying out of the work in connection with the colony.

16. The social side of life at the colony will be provided for, and ample provision will be made to make life enjoyable and comfortable at headquarters. A proper public building, where both religious and secular gatherings may be held, will be provided. A school house and educational facilities will be provided.

17. Buying and selling will be done upon a co-operative basis, and every assistance possible will be rendered to hasten the day when the soldier may be established upon a prosperous and independent footing.

18. Provision will be made at as early a date as possible for married men to have their families with them, and to the fullest extent practical returned soldiers with experience will be employed to direct the affairs of the colony.

19. Soldiers who may desire to go into fruit farming and chicken raising, or other like agricultural pursuits, will be given free instructions at the public institutions of the province.

Other plans having or their object the placing of soldiers on the land in old Ontario are under consideration.

AGRICULTURAL DEVELOPMENT IN NEW ONTARIO

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

THE Ontario Government is making a special effort to populate and bring under profitable cultivation large areas of fertile land in the northern part of the province. The Departments of Agriculture; Lands, Forests, and Mines, and of the Provincial Secretary, are co-operating in this work. Among the new enterprises decided upon are an agricultural high school and demonstration farm, a government creamery, demonstration clover fields and a plant breeding station.

AGRICULTURAL SCHOOL AND DEMONSTRATION FARM

THE Ontario Government is making plans for the erection of an Agricultural High School and Demonstration Farm at New Liskeard in Northern Ontario. The towns-people of New Liskeard and the farmers of the district are deeply interested in this work, and have pledged themselves to give it every support. The town of New Liskeard has donated seventy acres of land which will become a part of the Demonstration Farm and the farmers have agreed to a tax of 25c. per head for to be used in the support of the school. The school will be in the hands of the local school board and the Demonstration Farm will be financed and managed through the Northern Development Branch of Lands, Forests and Mines Department. The District Representative for Temiskaming, whose office is located at New Liskeard, will act as superintendent of

the farm and continue his work as District Representative.

There will be established a herd of Ayrshire cattle of strong rugged type suitable to conditions in that section of Ontario. A pavilion will be erected near the Agricultural High School for the judging of seed and live stock. The second floor of this building will be used as a class room assembly hall and gymnasium. The children attending the high school will have the use of this building throughout the year except during a few weeks in the year when practical courses in agriculture and domestic science will be held for adults.

A considerable amount of crop experimental work will be done on the farm, but the work in the main will be devoted to demonstrating the best methods of handling Temiskaming soils and the best crops and varieties to grow.

THE GOVERNMENT ESTABLISHES A CREAMERY

THE Ontario Government will this season establish a creamery at New Liskeard. In preparation for this a canvas was made of the farmers of the district when over eighty of them signed an agreement to send their cream to the creamery to be manufactured into butter. The Department has secured the services of a competent butter maker who will manufacture the butter for the patrons at a charge of

3½c. per pound until such a time as the factory is self-supporting. The farmers have agreed to take it over at first cost when that time arrives. There are at present in the district about 325 cows that are expected to supply cream to the factory during the coming season. The number of cows available being small the Government is making plans to purchase several carloads of cows and sell them at auction at New Liskeard.

The farmers in the New Liskeard district have fairly large clearings and will undoubtedly keep much more stock than they have in the past as a result of establishing this creamery. Other part of Northern Ontario, needing cows, will be similarly served. It is expected that several carloads of cows will thus be placed at the disposal of the farmers in that part of the province at such prices as the farmers are able to pay.

With a view to conserving the cattle stock of Northern Ontario the Department took in and fed a large number of cows belonging to farmers who had lost their barns and fodder in the conflagration that swept much of the country last autumn. At the

Demonstration Farm at Monteith ninety head are being fed and at New Liskeard fifty head. All these animals are females and are being cared for at the expense of the Government. These animals with their increase will be returned to the farmers on the 10th of May next. In a number of cases settlers who had cows giving milk that was needed for the families were allowed to keep their cows at home and the Government supplied them with two tons of hay.

A further help given the settlers who suffered losses by the fire, was the providing of each farmer with a hundred pounds of grass seed to sow upon his burned-over land.

DEMONSTRATION FIELDS

TO encourage the growing of clover, more particularly for seed, the Ontario Government is establishing close to the town of Matheson a fifty acre demonstration field. This field will be sown with No. 3 O.A.C. oats which have proven to be the most satisfactory oat grown in Northern Ontario and seeded down with clover. An accurate record of the expense incurred in connection with this work will be kept as well as the yields of clover seed will be secured so that definite information will be available *re* the possibilities of Northern Ontario for growing seed. Similar work will be done with tim-

othy and other grasses.

The town of Cochrane has planned to establish a demonstration field where a four-year rotation will be included and crops grown that are generally found on farms in Northern Ontario. Cochrane being a divisional point of the National Transcontinental and the terminus of the Temiskaming and Northern Ontario Railway a great many people interested in agriculture stop off at Cochrane to get information as to the possibilities of the country. It is hoped that this demonstration field will serve a good purpose in this connection.

SEEDING DOWN ROADSIDES AND WASTE AREAS

IN many sections of New Ontario where fires have killed all vegetation it is felt that something should be done to establish grasses in order that settlers may have pasture for their live stock and not

be put to the expense of purchasing hay for their animals at high prices. With this in mind plans are being made to seed down the roadsides and open spaces in the forest with grasses and clovers this spring.

A PLANT BREEDING STATION

THE Departments of Agriculture and of the Provincial Secretary are co-operating in the establishment of a plant breeding station on the Industrial Farm at Fort William. A greenhouse, 20 x 80 feet, is erected and gardens and other requirements provided. These will be in charge of Mr. W. R. Leslie, B.S.A., a graduate of the Manitoba Agricultural College. It is the purpose of this institution to produce and select hardy varieties of various kinds of fruits, ornamental shrubs, vegetables, and grain crops, for distribution throughout Northern On-

tario. There has been collected a large amount of plant material from Western Canada, North Dakota and other cold regions, as well as many promising varieties of fruits and ornamental plants from points in Northern Ontario. Much of this material was got together in 1916. As varieties are proved suitable for the district they will be distributed and tried out by District Representatives in their respective districts. This work is being carried on with funds provided under THE AGRICULTURAL INSTRUCTION ACT.

MR. REEK RETURNS TO ONTARIO

MR. W. R. Reek, B.S.A., who has, during the past two years occupied the position of Director of Agricultural Instruction in the Department of Agriculture of Prince Edward Island, has resigned that office in response to a call from the Minister of Agriculture for Ontario. Mr. Reek has been appointed assistant to Dr. Geo. C. Creelman, recently appointed Commissioner of Agriculture.

In Prince Edward Island Mr. Reek introduced a number of new activi-

ties, including school fairs, short courses in agriculture at different centres throughout the province, and the establishment of a tile industry, which is but a part of a general plan for the encouragement of under-drainage on the Island. He also played an important part in the extension of such co-operative enterprises as egg circles, and the grading and selling of wool. Mr. Reek will be succeeded by Mr. W. J. Reid, B.S.A., District Representative for Prince County, P.E.I.

THE COMPARATIVE SUSTENANCE VALUE OF CERTAIN STAPLE FOODS

BY R. HARCOURT, B.S.A., PROFESSOR OF CHEMISTRY, ONTARIO AGRICULTURAL COLLEGE

ON account of the high and increasing cost of food, which is imposing a heavy burden on a large percentage of the population, I have worked out a table that shows the comparative value of what may be termed the foods which constitute the plain necessities of life, which may be of some service as a guide in assisting those who find it necessary to exercise

economy in their purchases.

The constituents most valued in foods are protein, fat, carbohydrates and ash. Protein is essential in the food of animals, for without it no animal can grow or even subsist. Fat is of value in the formation of the fat of the body and for the production of energy and heat. The particular function of the soluble carbohydrates in the body is to

form fat, or, when oxidized, to produce heat and energy. Crude fibre, while possessing almost no food value, has an undoubted physiologically useful purpose in giving the needed bulk to the food. Ash is of great importance in the food of animals as it furnishes the phosphates, chlorides, and other salts which are needed in building up bone and tissues of the body.

It must not be forgotten, however, that palatability enters largely into the problem of what we eat and that the cheapness of the nutritious food is not the only point to be considered. However, people differ in their likes. The table submitted is based on the nutritive value of those foods which furnish the most nourishment for a given sum of money, leaving the question of palatability to be decided by the consumer.

The various nutrients of foods when supplied enable the body to grow and to repair its tissues as they are worn out in the necessary exercises of the body functions. They also supply the body with the energy needed for doing work, both internal and external, and furnish the heat to keep the body warm. All the nutrients, except the ash, may be oxidized or burned in the body, and are, therefore, sources of energy. Consequently, the total energy value of a food may be determined by measuring the amount of heat given off when a definite weight of the food is burned. This energy value is conveniently stated in terms of heat, the calorie, or unit of heat, being used for this purpose. The number of calories of heat a gram of each food is capable of producing, if fully burned, is given in the last column of the table.

We can assume that in foods of like nature, especially when used in a mixed diet, the digested protein, fat

and carbohydrates from one source are as valuable as those from any other. To make the comparison closer, however, we must bring these various factors to some common basis. As one of the main objects of food is to produce heat and energy, it is generally considered that if there is sufficient protein in the diet to do the work which it alone is able to perform, the amount of heat a food is capable of producing is the best basis upon which to make a comparison. With this idea in view we have figured the number of calories of heat as well as the pounds of protein, fat, and carbohydrates that will be furnished in one dollar's worth of a number of our common foods.

The following table shows that the foods derived from the cereal grains possess greater sustenance value than foods of other classes. This is due to the fact that they contain a larger relative amount of carbohydrates which are the cheapest food materials contained in our foods. They also contain comparatively large quantities of protein and fat which is more cheaply purchased in these foods than in the form of meat, fish, or eggs. For purpose of comparison rolled oats form the maximum of food value in comparison with their cost and are given a marking of one hundred, and all the others are figured in proportion. It will thus be seen that, according to this basis of comparison, if rolled oats are given a value of one hundred, fall wheat flour at present market prices is assigned the value of 92.8, white bread, 58.6, cheese 19.3, sirloin steak, 13.5, eggs, 5.2 and so on throughout the table. With this explanation the table may be studied with advantage by those who desire to secure highest results in food value in the purchase of their table supplies.

PROTEIN, FAT, CARBOHYDRATES AND FUEL VALUE OF ONE DOLLAR'S WORTH OF CERTAIN STAPLE FOODS

	Price	Protein Lb.	Fat Lb.	Carbohy- drates Lb.	Fuel Value Calories	Compara- tive Values
	\$ c					
Rolled oats	5 per lb.	2 5	1 36	14 3	36,950	100
Fall wheat flour	4 75 " cwt.	2 0	20	16 0	34,307	92 8
Spring wheat flour	5 00 " "	3 0	20	14 3	33,780	91 4
Corn meal	5 " lb.	1 31	25	16 26	33,785	91 3
Rolled oats (package)	25 for 4 lb.	2 00	1 09	11 5	29,560	80 0
Sugar	8 00 per cwt.			12 5	23,250	62 9
Rice	7 " lb.	1 06	05	11 3	23,210	62 8
Peas	7 " "	3 00	19	9 0	23,121	62 6
White bread	16 for 3 lb.	1 58	38	9 1	21,650	58 6
Buttermilk	10 per gallon	3 0	50	4 8	17,362	47 0
Skim milk	10 " "	3 4	30	5 1	17,070	46 2
Barley, pearl	10 " lb.	84	10	7 8	16,492	44 6
Beans	10 " "	1 95	27	6 0	15,500	42 0
Potatoes	2 25 " bag	87	04	6 24	13,397	36 2
Malta Vita	10 " 12 oz.	74	10	5 87	12,716	34 4
Toasted Corn Flakes	10 " 12 " "	42	11	6 06	12,517	34 0
Grape Nuts	15 " 17 " "	81	07	5 56	12,143	33 0
Milk	8 " qt.	1 04	1 27	1 66	10,402	28 2
Shredded Wheat	13 " 12 oz.	66	05	4 42	9,659	26 1
Beef, flank	14 " lb.	1 21	1 36		7,970	21 6
Butter	45 " "		1 88		7,933	21 5
Cheese	30 " "	93	1 22	1 4	7,138	19 3
Mutton chops	24 " "	56	1 20		6,106	16 5
Ham, smoked	28 " "	51	1 19		5,963	16 1
Beef, sirloin	25 " "	66	65		4,000	10 8
" round steak	24 " "	79	53		3,718	10 6
Lamb, hind quarter	27 " "	61	60		3,672	10 0
Ham, smoked and cooked	45 " "	44	50		2,930	8 0
Salmon, canned	25 " "	78	30		2,716	7 3
Salmon trout (fresh)	15 " "	61	34		2,569	7 0
Cod (salted)	18 " "	1 05	02		2,307	6 2
Eggs	48 " doz.	37	29		1,912	5 2
Halibut (fresh)	25 " lb.	61	18		1,894	5 1

MANITOBA

THE SLIDING SCALE SYSTEM OF PRIZE AWARDING

BY S. T. NEWTON, B.S.A., SUPERINTENDENT, EXTENSION SERVICE

THIS year Manitoba, for the first time, tried out the sliding scale in awarding prizes at the Provincial Seed Grain Fair, and although it did not work out quite as expected on account of the number of exhibits being only about one-third as many as last year, yet proved of sufficient merit to be continued next year, when it is hoped by using the sliding scale, and taking

into consideration the score made by each sample, to provide a system which will give satisfaction in every particular.

Instead of judging the grain in the three districts as was originally intended, the three districts were put into one and the following combination of the oat and wheat scales used:

TOTAL VALUE	No. of Entries	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
\$210	20 or over	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2
210	18 or 19	28	26	24	22	20	18	16	14	12	10	8	6	4	2	
182	16 or 17	26	24	22	20	18	16	14	12	10	8	6	4	2		
156	14 or 15	24	22	20	18	16	14	12	10	8	6	4	2			
132	12 or 13	22	20	18	16	14	12	10	8	6	4	2				
110	10 or 11	20	18	16	14	12	10	8	6	4	2					
90	8 or 9	18	16	14	12	10	8	6	4	2						
72	6 or 7	16	14	12	10	8	6	4	2							

Classes that will not bring out for a Provincial Fair at least six entries are scarcely of sufficient importance to warrant being included, while if the number of entries are over 20 the competition will be particularly keen with only a fraction of a point between each, consequently, the second prize grain is very likely to be almost as good as the first prize exhibit, and, as a consequence, should receive almost as much consideration, and the sample winning 15th place is usually of very high quality, and if it comes within the list of winners, gives encouragement to the exhibitor to try for a place higher up next year.

A few of the features which worked out to advantage were:—

1. In districts where the working of the sliding scale was understood the number of entries was equal to that of even the best years.

2. It provides for a large number of medium prizes rather than a few large ones. This seems very desirable at a provincial show where very frequently there is only a quarter or half a point between one score and the next higher or lower one, and a different judge might even reverse the score.

3. Marquis wheat now represents practically 80 per cent of the total wheat entries,

consequently, the sliding scale permits larger prizes being awarded where the competition is keenest and the standard much higher.

Last year the eighth prize sample in Marquis secured as high a score as the first prize sample of Red Fife, yet each received the same amount of money.

The following is a list of the six highest scores in each of the three classes, wheat, oats and barley:—

WHEAT

S. T. Smith, Headingly	92 ¹ / ₄
Jas. Carr, Warrenton	90
S. Larcombe, Birtle	88
W. D. Dodge, Birtle	87 ³ / ₄
Thos. Nattrass, Treherne	86 ³ / ₄
J. R. McLean, McCreary	85

OATS

M. P. Mountain, Solsgirth	92 ¹ / ₂
S. Broadfoot, Solsgirth	92 ¹ / ₄
Wm. Brown, Deloraine	90 ³ / ₄
R. Dickenson, Solsgirth	90 ¹ / ₂
S. Larcombe, Birtle	90 ¹ / ₄
Val Gutscher, Swan Lake	85 ³ / ₄

BARLEY

W. D. Dodge, Birtle	86 ³ / ₄
John Wiener, Miami	86 ¹ / ₂
Walter Sayward, Beulah	85 ³ / ₄
Keeler Dale, Boissevain	84 ³ / ₄
D. Munro, Warrenton	81 ³ / ₄
Val Gutscher, Swan Lake	81 ¹ / ₄

SASKATCHEWAN

THE BETTER FARMING TRAINS

IN 1914 a total of 88 places were visited by the better farming trains; the attendance was approximately 36,000 people; the distance travelled was 1,344 miles; the total cost was \$7,000.70.

In 1915 the number of places visited was 135; the distance travelled was 1,946 miles; the attendance was 37,109, made up of 18,262 men, 13,392 women and 5,455 children; the total cost was \$6,742.02.

In 1916 the number of places visited was 56; the distance trav-

elled was 810 miles; the attendance was 22,673, made up of 8,245 men, 5,210 women and 9,218 children; the total cost was \$4,787.22.

In each of these years the College of Agriculture furnished the live stock for demonstration purposes, as well as many other exhibits, and also supplied several members of its regular staff who acted as lecturers and demonstrators. The railway companies interested supplied the rolling stock and operated the trains free of charge.

It should be remembered that the trains did not run over the same route in each year, in fact, in the itinerary covered during the whole of the three years, not more than one

or two places were visited twice. This means that 279 different places were visited, and information conveyed to 95,782 persons.

CO-OPERATIVE WOOL MARKETING

ONE of the most successful enterprises of the Co-operative Organization Branch has been the co-operative marketing of wool for the sheep raisers of the province. The Branch has recently compiled an interesting comparative

statement showing the results achieved in each of the three years during which the scheme has been in operation, and the figures certainly furnish good arguments for a strong future development along this line:

	1914	1915	1916
Number of pounds handled...	69,404	150,358	179,890
Prices realized, cents	17 $\frac{3}{4}$	23	32 $\frac{1}{2}$
Number of contributors	179	310	478

It is intended to carry on co-operative wool selling again this year. Plans are now being considered and preparations are well under way. The assembling at one point of large quantities of wool so that buyers can conveniently bid on it,

the careful grading of the product, and its preparation for sale in the best manner so as to meet the requirements of the trade, are all factors which tend to bring the producer a much better return than he could obtain by any other means.

GOPHER DAY

GOPHER day—the day set aside for a general attack on the gophers of the province—has been settled upon as May first.

Rural municipal councils, farmers' organizations, weed inspectors and school teachers will be asked to co-

operate with the Department of Agriculture in order that the final arrangements may be carried out in sufficient detail to result in a uniform, consistent, determined and effective attack on a pest that costs Saskatchewan millions annually.

ALBERTA

PROFESSOR OF ANIMAL HUSBANDRY FOR THE COLLEGE OF AGRICULTURE

THE College of Agriculture of the University of Alberta has added to its staff a Professor of Animal Husbandry in the person of Professor A. A. Dowell, a graduate of the Iowa Agricultural College. Professor Dowell, since his graduation in 1915 until his appointment at the Alberta institution on February 1st, was a lecturer on the Animal Husbandry staff at the Iowa

College. He has had valuable experience also as an exhibitor and as a manager of a large herd of live stock in Nebraska. He was a member of the National Dairy Judging Team from Ames, Iowa, also a member of the International Live Stock Judging team. He comes to Alberta highly recommended by the institution he has left.

PART III

Rural Science

PRINCE EDWARD ISLAND

SCHOOL AND COMMUNITY IMPROVEMENT

BY MISS HAZEL STERNS, SUPERVISOR OF WOMEN'S INSTITUTES

IT is one of the aims of the Women's Institutes to bring into closer relation the home and the school. To accomplish this parents must be brought into sympathy and co-operation with the school, and how better can this be done than by bringing the mothers face to face with the unsanitary conditions surrounding the children and in that way making them realize more fully the necessity for improvement.

Since the organization of the women's institutes in Prince Edward Island there has been a marked improvement in many of the rural schools of the province. The institutes are organized to include one, two, or three school districts, and at present 63 schools may receive the benefits of the women's institutes.

This improvement may be largely attributed to the fact that many of the institutes hold their regular monthly meetings in the schools, and the need of bettering conditions there has been brought more closely to the attention of the institute members.

To abolish the open water pail, and common drinking cup, for a covered drinking fountain and individual cups has been the first work of nearly all the institutes. The worn soft wood floors of many of the schools have been replaced by the more sanitary hardwood floors.

The school-rooms have been painted inside and out, new desks, blackboards, blinds and maps have been supplied where needed, and some districts have had the school grounds fenced.

The institutes have endeavoured to encourage good reading among the children and in several districts splendid school libraries have been started through their influence.

In addition to these general improvements the different institutes have taken up various phases of this work. One progressive institute took the entire responsibility of putting the primary department of their school in first class condition with the result that their work was an incentive for the district to bring about improvements in the other departments of the school.

In some districts a committee of institute members is appointed to visit the schools regularly. One institute supplies the children with bulbs and flower seeds in order to encourage home projects, while other institutes encourage the children by giving prizes to the school.

The institutes have aimed to develop the æsthetic side of the pupils' natures by having window plants in the school-rooms, suitable pictures on the walls, and in many ways making the rooms more attractive, so that not only will the children have the pleasure of working in

more comfortable surroundings, but they will as a consequence do more efficient work.

When the institute meetings are held in the afternoon, the children are occasionally invited to remain and to assist in the programme. At one of these meetings held recently the programme consisted of an exhibition in physical drill by the children under the direction of the teacher.

The institutes have not entirely confined their work to improving the schools and some attention has been centred on community improvement. Some of the ways by which this has been done has been by the forming of young people's clubs (under the direction of the institute), baseball clubs, planting shade trees, and improving public halls. Nearly every institute subscribes to magazines and circulates them among the members, and one institute has formed a splendid community library in the district.

The funds for carrying on this work of bettering the schools and the communities have been raised by

concerts, socials, amateur plays, and lectures, all of which have benefitted the social life of the people of the districts. It is here that the young people of the community have more particularly an opportunity of doing their part towards assisting in the good work of the institutes, and it helps them to feel that they have a place and some responsibility in the community.

These advancements along school and community lines were, until the outbreak of the war, the principal work of the institutes. Since that time all the institutes have devoted their energies towards patriotic work in all its phases, and while the schools are by no means neglected by the institutes, the greater part of the money raised is necessarily given to the various patriotic funds.

We look forward to the time, however, when the institutes will be enabled to resume their community work, and the members, working with one common purpose and a spirit of co-operation, will undoubtedly increase to some extent the efficiency of the schools of Prince Edward Island.

NOVA SCOTIA

THE WOMEN'S INSTITUTES

BY MISS JENNIE A. FRASER, SUPERINTENDENT

THE Women's Institutes of Nova Scotia have completed a very successful and highly gratifying year. Only five new institutes have been organized, as it was decided to hold no organizing campaigns until after the war. That the five new institutes were organized at the request of the women themselves seems to prove that the influence of the institute is being felt more and more strongly in the province. The institutes number forty-nine with a membership of 1,600 and each institute is alive and working hard both for the patriotic causes,

and for community improvements. Of the latter, the schools of the province come in for the greatest assistance and many improvements along sanitary lines have been instituted as well as successful efforts made towards beautifying both the grounds and the school. Trees have been planted, sidewalks laid, libraries installed and public grounds beautified and much splendid charity work accomplished. Sewing classes for school girls have been organized and superintended by the institute members in several districts and school fairs are always certain of

receiving the assistance of the institute.

The amount of money raised during the year was \$8,333.12, of which \$4,654.72 was given to the Provincial Red Cross; \$1,899.21 to other patriotic causes as Belgian Relief, Prisoner's War Fund and Patriotic Fund, and the remainder, \$1,779.19 was used for buying Red Cross supplies and for community work, which seems a very fair division. Two hundred and thirty-one boxes were sent to the Red Cross; 2,745 pairs of socks and two boxes (not counted) of socks were forwarded to Field Comforts; 382 jars and three barrels (not counted) of jam to the hospitals and 336 parcels were also sent to the hospitals to be distributed Christmas morning to the sick soldiers. As a few of the institutes were situated near military camps during the year, they entertained the soldiers several times, and sent good things to the military hospitals.

We had a very interesting display of hand-woven articles in linen and wool at the provincial exhibition at Halifax, which was greatly admired,

and also under our supervision the Department of Horticulture had a splendid display of vegetables and canned vegetables. Two ladies from Lunenburg county, which county sent most of the fine exhibit of home-woven goods, gave daily demonstrations in weaving and spinning, which proved to be one of the most interesting things in the whole fair.

Besides the annual short course for women held at Truro, a very successful course was held at Lawrencetown, Annapolis county in May which was splendidly attended and much interest manifested.

Addresses and demonstrations were given before each institute during the summer, and, judging from the reports, the members of the institutes found them very beneficial.

With four successful years behind them the institutes look forward to a bigger, better year in 1917, doing everything in their power to assist the Empire in this trying time and not forgetting, at the same time, the home and community interests.

MANITOBA

HOME AND SCHOOL GARDENING

BY S. E. LANG, INSPECTOR OF SECONDARY SCHOOLS, WINNIPEG

IN Manitoba there were some efforts in the direction of school horticulture over thirty years ago. In not a few instances attempts were made to improve the school grounds by planting trees. The chief drawback at that time was the lack of fencing. Here and there during the early nineties enterprising teachers planted and maintained prosperous flower gardens at their schools. Progress since those early days has been gradual, but very steady, and it is likely that the school garden and the home garden will, before long, be generally regarded as most

useful adjuncts to the regular work of the school in all parts of the province.

In the years just before the war the inspectors reported that in many cases owing to lack of fencing, insufficient water supply, constant change of teachers, and lack of system in the work, the results were, broadly speaking, unsatisfactory. At the same time there was an unmistakable note of optimism; teachers, trustees, and in many cases the whole community had begun to evince a real interest in the movement. Naturally, the gardens in connection

with town and village schools and rural consolidations were at first more successful than those of the one-room rural school, because they were more easily supervised, particularly during the long vacation. However, the efforts of the teachers in certain districts demonstrated in a practical way what might be accomplished. One teacher, for example, placed half an acre of his own farm adjoining the school property at the disposal of the pupils and the result was a miniature experimental farm. In 1914, an inspector reported that by actual count 30 per cent of the schools in his district were supplied with wells, 40 per cent had trees planted, 75 per cent were fenced, and 80 per cent had gardens. The situation in regard to water led to the suggestion that eave-troughs should be placed on rural school buildings to aid in conserving a water supply. During recent years a very considerable amount of energy has been put forth in the development of the school garden idea, sometimes with encouraging results, sometimes with a very moderate amount of success. An inspector stated in 1915 that where the gardens were unsuccessful the real causes of failure were lack of cultivation, carelessness in thinning, late preparation of the seed bed, and insufficient attention to the weeds. Another inspector stated in last year's report that the weed difficulty could be easily overcome and, in certain cases, was overcome by holding weekly picnics or working bees at the school grounds during the long vacation.

In 1912, a Director of School Gardening for the province was appointed by the Department of Education with the view of placing the work on a proper basis in its relation to the programme of studies as a whole, and to nature study and elementary agriculture in particular. Addresses were delivered at teachers' and trustees' gatherings, special instruction was given in Normal schools, and very considerable quan-

ties of material such as trees, shrubs, and seeds for carrying on agricultural experiment work were distributed among the schools. Grain and vegetable growing contests and poultry raising and animal feeding competitions were organized, and an interest in school fairs was carefully fostered. The home garden, which appeals very powerfully to the practical economic instincts of the wide-awake young people, now occupies an important place in the education of rural school children. Indeed, there are indications that these activities will result in many instances in a very substantial increase in actual production.

There are those who express concern lest the economic features of the situation should overshadow the educational aspect of the work. They fear that young people, who engage in home and school gardening with a view to producing a type of fruit or vegetable, which by its excellence will command a high price, are somehow in danger of missing some mysterious educational benefit, which they might conceivably secure if the gardening were carried on without reference to the market value of the produce. But it is clear that the conditions and processes of plant growth, the actual tending, watering, weeding, and hoeing, pruning, harvesting, and housing of the fruits of the earth, and such matters as soils and soil physics, rainfall, insect pests, and all other phases of nature study and elementary agriculture can be carried forward just as readily and effectively in a school or home garden that pays its way as in one that does not. At the same time it should not be forgotten that some practical experience in an actual garden is an essential part of a liberal education; and the primary and fundamental purpose of the Department in encouraging home and school gardens is educational in the general and social sense of the word. Incidentally, certain practical economic results will be secured and certain vocational aptitudes and capacities developed.

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

AGRICULTURAL LEGISLATION

THE STRAY ANIMALS ACTS

EACH province and organized territory has its laws regarding the running at large of animals. While the regulation of such a matter must mainly be left to the municipalities, there must, of course, be common laws for all to observe and for the defining of municipal power. Herewith has been brought together a summary of the leading acts adopted for this purpose. It might be observed that these Acts are intended not only for the protection of life and property and for the care of the highways, but also for the preservation of breeds. While of necessity there is a similarity in the provisions of the Acts, there are considerable differences in the method of administration and in the penalties incurred by permitting violations of the legislative laws and the municipal by-laws.

For convenience sake the matter is dealt with by provinces as follows:

PRINCE EDWARD ISLAND

"Domestic Animals Act" of Prince Edward Island is divided into five parts. Part 1 relates to the regulation by stock districts of the running at large of animals." Provision is made for the appointment of reeves by the trustees of a school district, whose duties it shall be to seize and take up within the district all animals running at large in violation of the provisions of the Acts. Such animals may be sold after ten days' notice.

The second part "relates to the running at large of animals in a district, or place wherein enclosed regulations are in force," and provides that it shall not be lawful for any stallion over one year old to be at large beyond the enclosures of the owner thereof, between April 1st and December 1st; for any bull eight months old between May 1st and November 1st; for any ram over three months old, between August

15th and December 15th; for any boar over three months old at any time during the year. Such animals running at large may be seized by anyone in the district and sold after due notice has been given to the owner thereof, or posted in conspicuous public places. The owner of any animal so seized, shall be entitled to have the same returned to him, if claimed before the sale, on payment of the following penalties to the holder of the animal: for each stallion \$5; for each bull \$2; for each ram \$2; and for each boar \$2, in addition to such charges for keep and other expenses incurred. In default of payment of the penalties the offender is liable to be imprisoned in the common jail for any period not exceeding 10 days.

Part 3 relates to the running at large of "unruly or dangerous animals and unringed swine in any district or place" and provides that the owner of unruly animals at large may be ordered by a Justice of the Peace to confine the same. On refusal and conviction, the offender is liable to the penalty of \$2 for each day such animal shall be seen at large thereafter, and is also liable for any damages caused by such animals.

Part 4 relates to trespasses by animals on an enclosure and provides for the impounding of any animal breaking into an enclosure other than that of the owner thereof. The person impounding such animals is to direct to the Justice of the Peace a sworn affidavit giving the time and place and the amount of damage caused, a description of the animal, the name and the residence of the owner, or supposed owner, and the place wherein impounded. Three appraisers appointed by the Justice of the Peace are to view and place a value upon the damage done and the Justice may order payment of such damages, on non-payment of which the animal may be sold.

NEW BRUNSWICK

An Act relating to cattle running at large in New Brunswick, passed in 1904, gives power to the County Council of any municipality to make by-laws to prevent and regulate the straying, or running at large, of horses, cattle, sheep, swine, goats, dogs and poultry, in any specified district, highway or by-way in any parish, and to impose penalties and to prescribe how they are to be recovered.

ONTARIO

The Pounds Act Revised Statutes, 1912, makes the owner or occupant of the land having an animal in charge responsible for any damage caused by that animal running at large, even though "the fence enclosing the premises of the complainant was not of the height required by by-law." If not previously replevied the poundkeeper is authorized to impound any horse, cattle, sheep, goat, pig, or poultry distrained for unlawfully running at large. If the owner of poultry neglects to prevent it from trespassing after receiving notice he incurs a penalty not exceeding \$10. The poundkeeper has to notify the clerk of the municipality of any seizure made with a description of the same. The person distraining is required to deposit poundage fees, if demanded, and to deliver duplicate statements of claim for damage to the poundkeeper, not exceeding \$20, exclusive of poundage fees. On giving satisfactory security the owner can reclaim an impounded animal. If horse, cattle, sheep, goat or pig are distrained by a resident of the municipality he may retain the animal in his own possession by giving notice to the owner, if known, and, if unknown, to the clerk of the municipality. The distrainer can then claim no damages and the clerk must post a notice with description of the animal in some conspicuous public place. If the value of the animal or animals so distrained is \$10 or more a copy of the notice must be inserted in a local newspaper for three successive weeks. Four clear days must be allowed to elapse in the case of pigs or poultry before sale and eight days in the case of horses or cattle. If the distrainer retains possession of pig, goat or sheep one month must elapse before notice of sale is given; if horse or cattle two months must elapse. The notices of sale must be posted for three clear successive days in three public places if the animals are not sooner replevied. The distrained or impounded animal must be provided with good and sufficient food, the owner of the animal to be responsible for payment of the same and for time, trouble and attendance. Three fence-viewers of the municipality, nominated by the parties in the case and the poundkeeper, are to adjust the damage in case of any dispute.

An Act passed in 1914 and entitled "The Protection of Pure-bred Cattle Act" provides:

(a) The owner of any bull who allows such bull to run at large or be off his premises, not being confined or led by a halter, shall incur a penalty of \$25, recoverable under The Ontario Summary Convictions Act.

(b) In case a pure-bred cow is got in calf by a bull running at large, the owner of such cow shall be entitled to full damages from the owner of such bull.

MANITOBA

The Animals' Act of Manitoba states that it shall not be lawful to allow the following animals to run at large at the times following:

(a) Stallions of one year old and upwards at any time of year.

(b) Bull over nine months old at any time of the year.

(c) Rams over four months old from first day of April to the first day of August.

(d) Boars over four months old at any time of year.

The penalty for any offence against these restrictions is not less than \$10 and not more than \$25, and, in default of payment, imprisonment for not less than 10 days or more than one month.

In addition to the foregoing Act, the Stray Animals Act, Chapter 186 of the Revised Statutes of Manitoba 1913, makes provision for the seizure, impounding and disposition of stray animals in unorganized territory.

SASKATCHEWAN

"The Stray Animals Act of 1915" for Saskatchewan specifically provides that no stallion over one year old and no unregistered bull over eight months old shall be allowed to run at large. Subject to the provisions of the Act and municipal regulations, it is lawful for animals to run at large in Saskatchewan except in cities, towns and villages. If animals suffering from blackleg, or animals belonging to an infected herd, are allowed to run at large the person responsible is liable to a fine of not less than \$50, nor more than \$200. If an animal suffering from lumpjaw is so permitted the owner or caretaker becomes responsible for a fine of not less than \$10 and not exceeding \$100. The balance of the Act is divided into parts. Part 1 "Affecting rural municipalities" gives power to the council of any municipality subject to the provisions of section 3 of the Act to define by by-law the proportion of such municipality and determine the period of year in which animals shall be restrained from running at large.

Part 2 "relating to the herd district in organized areas," states that the Minister of Agriculture by order published in *The Saskatchewan Gazette* may declare that any area described in such order not within the limits of a city, town, village or rural municipality shall constitute a herd district, and, thereafter, by order published in like manner the Minister may enlarge the herd district by adding thereto any township, or townships, adjoining the limits of any municipality in which stock is restrained from running at large.

Part 3 "the distraining and impounding of animals" clearly states that any proprietor may distrain any animal that is running at large in any municipality, contrary to the provisions of any by-law of such municipality passed under the provisions of this Act or owned by a non-resident of a municipality, or running at large in the herd district between the 15th day of May and the 31st day of October, or an estray animal. This section also makes provision for the impounding of such animals.

Part 4 "respecting pound-keepers," outlines the method of procedure to be followed by the person impounding any animal and makes regulations for the sale of impounded animals, etc.

Part 5 "disposal of other estray animals" applies to unorganized portions of the province not included in the herd district, and to organized portions of the province in the event of a pound for any reason not being accessible or available, and makes provision for the disposal of estray animals within the foregoing portions of the province.

Part 6 "lawful fences and trespass on lands they enclose" states what constitutes a lawful fence, mentioning material, height, etc. The owner of an animal which breaks into or enters on any land enclosed by a lawful fence has to compensate the proprietor for any damage done by such animal.

ALBERTA

An Act for "Restraining Dangerous and Mischievous Animals", passed in Alberta in 1913, provides that on information laid

before a Justice of the Peace, that the accused owns or has in his possession any cross or dangerous or mischievous animal, or animals, not confined or restrained, in such a manner as to protect the public from injury or loss, such Justice of the Peace may, when the owner of such animal or animals is known, issue a summons directed to such person or persons, and, upon conviction on the evidence of two credible witnesses, the Justice may order the accused to confine or restrain such animal or animals. Upon default of compliance with such order, a fine not exceeding \$50 and costs for each offence may be imposed. In default of payment of said fine, the offender may be committed to the nearest common jail, with or without hard labour, for a period not exceeding thirty days. Other Acts provide for the limitation of animals running at large and for permission so to do very much on the same lines as those defined in the case of Saskatchewan.

BRITISH COLUMBIA

The Animals Act of British Columbia passed in 1897 and amended in 1915, makes it unlawful to allow the following animals to run at large:

(a) Swine at any time of the year.

(b) Stallions of one year old or upwards at any time of the year, except in such districts as the Lieutenant-Governor in Council may from time to time define.

(c) Bulls over nine months old at any time of the year except in such districts as the Lieutenant-Governor in Council may from time to time define.

Any owner of any such animal permitting the same to run at large within the prohibited time and place, is liable on summary conviction before a Justice of the Peace, or a Stipendiary Magistrate, or a Police Magistrate, for each such offence, to a penalty of not more than fifty dollars. It is provided that no conviction under this section shall bar an action for damages in respect of such violation.

In addition to this legislation, municipalities have the right to pass by-laws to prevent the running at large of any animals within municipal limits.

PROTECTION OF SHEEP AGAINST DOGS

ON pages 150 to 152 of the February issue of THE AGRICULTURAL GAZETTE there appeared an article on the above subject. In that article, the Quebec Act, passed in 1916 should have been outlined and described instead of the Act passed in 1909, and amended in 1912. The main features of the Act passed in 1916 are that twenty-five ratepayers in any municipality upon signing a petition may request and demand that a by-law be passed by the Council of the municipality,

which shall provide for the establishment of an annual compensation fund consisting of the proceeds of an annual tax imposed upon each dog kept within the municipality. Two-thirds of the damages are paid from this fund to the sheep owner suffering from the depredations of dogs. Dogs suspected of sheep killing may be ordered to be destroyed by a Justice of the Peace when satisfied that the evidence against the dog is correct.

ACTIVITIES OF TORONTO BACK-YARD GARDEN COMMITTEES

THE Back Yard Garden Committee of the Toronto Women's War Time Thrift Movement was started in January with the main idea of national production during this year of great need in the Empire.

Here was a work for women to undertake. It seemed almost too stupendous for the seven women who composed the committee to start out to have vegetables produced in every city back-yard of a large place like Toronto.

However, as they were all practical gardeners, their aim was to have 100,000 gardens started in the city and suburbs. If each should raise \$10 worth of vegetables it would mean \$1,000,000 for the Empire.

All the societies already organized in this work, such as the horticultural, and the Toronto Vacant Lands Associations, were asked to help and have been most cordial in assisting the work of the Back-Yard Garden Committee.

LECTURES AT TECHNICAL SCHOOL

Dr. McKay, of the Technical School, when asked, at once arranged for a course of lectures in gardening at the Technical School every Monday evening. These lectures were free to the public and proved interesting and helpful. It was up to the Garden Thrift Committee to secure a large attendance. This they did by calling the attention of the different women's organizations in the city to these lectures and asking them to notify their members. There was an average attendance of 400.

There are 1000 women's organizations in Toronto and these have all been sent a circular letter asking each society to interest its members in the production of vegetables in the city back-yards, and also, telling them that in order to have successful vegetables it is necessary to destroy insect pests.

A campaign is just being started against cocoons of the tussock moths and tent caterpillars. Every woman is asked to look around her own property and to destroy these cocoons, which may be found sticking to fences, on the trees and on porches.

The Boy Scouts are being organized to destroy these insect pests and are doing it without remuneration as a national service.

Dr. Gordon Hewitt, Dominion Entomologist, and Dr. Bethune, Entomologist of the Ontario Agricultural College, have kindly furnished the committee with cuts of these insect pests, with descriptions of

their habits, and these are being reproduced in all the city newspapers.

The City Park Commissioner is going to have all the trees sprayed in the city, and is employing returned soldiers for this work.

The Ontario Department of Agriculture has supplied free to the different societies and individuals applying either to them or to the Back-Yard Garden Committee helpful literature on vegetable growing, garden planning, poultry and canning and preserving of vegetables and fruit.

SCHOOL BOARD HELPS

The Public School Board, seeing the demand for instruction in gardening, is giving a course of lessons every school day from March 12th to May 4th, exclusive of the Easter holidays (April 5th to 17th), in every school in the city. In some the lessons will be at 4 p.m. and others at 8 p.m. These will be open to the public. The Women's War Time Thrift Committee hope to secure a very large attendance at these lessons. Programmes are being issued and notices put in the daily papers.

With the assistance of the Toronto Vacant Lands Association, the Back-Yard Garden Committee hope to interest soldier's wives in gardening. The members of the Imperial Order of the Daughters of the Empire, who visit each soldier's family, have undertaken to distribute little printed slips on which is to be written name, address, and whether the woman wishes her own garden dug or wishes a vacant lot to cultivate. These names will be indexed and then sent on to the secretary of the Toronto Vacant Lands Association. Arrangements have been made so that the gardens of soldier's families will be dug free of cost and also that they will be provided with seed. For people living in apartments, or those who wish a larger garden than they have, the Toronto Vacant Lands Association will provide lots of from 2000 to 5000 square feet with necessary seed, fertilizing, ploughing, and harrowing the lot for \$1.00. Those who are interested in bargains will probably find this one of the biggest they ever got in their lives.

WORKING THROUGH ORGANIZED BODIES

In this way the committee is working through organized bodies of women and through them it hopes to reach individuals. The proof of the work will be shown in the production from the city gardens during the summer and autumn. If the burden of hard-pressed housekeepers has been relieved, and people have either been able to make some money for individual or patriotic purposes, or for investment in the

war loan, or if the people have been kept healthier by the outdoor life and exercise, and by health-giving diet, and if the anxious fears of soldiers' wives and mothers have been calmed, then the committee will

feel that their work has been of some service to the Empire which they love, and the leaves of these city gardens may indeed prove for the healing of the nation.

CO-OPERATIVE MARKETING OF WOOL IN ONTARIO

THROUGH the co-operation of the Ontario Sheep Breeders' Association and the Dominion and Provincial Departments of Agriculture, arrangements are being perfected for the co-operative marketing of the wool clip of the province of Ontario. The wool will be shipped freight prepaid to Guelph, Ontario, where it will be stored in the Winter Fair building, insured against loss, graded by experts from the Live Stock Branch of the Dominion Department of Agriculture, and sold according to grade to the highest bidder. A charge of five cents a fleece is being made to cover insurance and other incidental expenses. In order that this movement may reach the greatest numbers of wool growers possible, the services of the District Representatives of the Ontario Department of Agriculture are being requisitioned. Intending shippers are requested to make application to their County Representative, who will then forward applications to R. W. Wade, Department of Agriculture, Toronto, Secretary of the Sheep Breeders' Association. The necessary sacks, twine, tags, etc., for the wool will then be forwarded to the Representative,

who will deliver them to intending shippers.

District Representative conferences have been held at Ottawa and Guelph, where instruction relative to the co-operative scheme of handling wool, grading and sorting was given to the District Representatives by officials of the Dominion Live Stock Branch. At these conferences in addition to the wool question, the Live Stock Commissioner, Mr. John Bright, outlined the policies of the Live Stock Branch in affording assistance to the farmers of Canada in the breeding of pure-bred live stock, dealing particularly with the federal scheme for assisting improved horse breeding and urging upon the District Representatives to form clubs, where possible, to secure the advantages of the policy adopted, whereby the Live Stock Branch would pay an amount equal to 40 per cent of the total amount paid at the close of the service season. Other subjects receiving consideration were the encouragement of the breeding of pure-bred dairy and beef cattle, and the growing and marketing of bacon hogs.

ADVISORY BOARD ON WILD LIFE PROTECTION

THE Dominion Government, by an Order-in-Council dated 28th December, 1916, has appointed an interdepartmental Advisory Board on Wild Life Protection for the purpose of formulating plans regarding the protection and use of the wild life—by which term is meant the fur-bearing and big game mammals, the wild fowl and other animal life—of the North Western territories, and of advising in the administration of the North-West Game Act and of the legislation under the recently ratified international treaty for the protection of Migratory Birds in Canada and the United States, and, generally, for the purpose of advising on questions relating to the protection of and use of wild life in Canada.

The Advisory Board is constituted as follows:

James White, Assistant to the Chairman of the Commission of Conservation.

D. C. Scott, Deputy Superintendent-General of Indian Affairs.

Dr. C. G. Hewitt, Dominion Entomologist.

Dr. R. N. Anderson, Geological Survey.

J. B. Harkin, Commissioner of Dominion Parks.

Mr. James White is Chairman and Dr. Hewitt is Secretary of the Board; Mr. White and Dr. Hewitt are also representatives of the Government on the Permanent Consultative Commission for the International Protection of Nature.

OTTAWA SCHOOL BOYS MAKE BIRD HOUSES

AN exhibition and sale of bird houses was held in the city of Ottawa on March 2nd to 7th. The display, which included upwards of 1000 nest boxes, was the result of a competition by the boys of the Ottawa Public Schools held under the auspices of the education committee of the Ottawa Humane Society. The work was set in motion about a year ago, when

meeting of the Humane Society at which the prizes were presented. Classes were provided for boxes, made from wood in its natural state, and from worked or dressed wood; for martin boxes, and for the largest number of boxes made by one boy. A special prize of a silver cup was awarded to the school in which the greatest number of boys took part in the competition. A



EXHIBITION OF BIRD HOUSES CONSTRUCTED BY SCHOOL PUPILS, CARNEGIE LIBRARY, OTTAWA

Dr. C. Gordon Hewitt, Dominion Entomologist, on behalf of the Ottawa Humane Society, took the matter up with Dr. J. H. Putman, Chief Inspector of Public Schools, who in turn secured the co-operation of the teachers. The boxes were to a great extent made under the direction of the manual training teachers of the city.

The exhibition opened with a public

class is provided for photographs of houses inhabited by birds during the coming summer. The funds for awards were provided by private subscription. The bird houses not required by the boys for their own use were sold at moderate prices and the funds thus obtained were donated to the Red Cross Society.

ASSOCIATIONS AND SOCIETIES

THE SASKATCHEWAN STOCK GROWERS' ASSOCIATION

The annual convention of the Saskatchewan Stock Growers' Association will be held at Maple Creek on June 6th and

7th. The Secretary of the Association is J. D. Simpson, Moose Jaw, Saskatchewan.

THE INTERNATIONAL GOOD ROADS CONGRESS

The Fourth Canadian and International Good Roads Congress under the direction of the Dominion Good Roads Association, will be held this year in the

Horticultural Building, Lansdowne Park, Ottawa, opening on Tuesday, April 10th, and continuing through Wednesday, Thursday, Friday and Saturday.

THE CANADIAN BROWN SWISS ASSOCIATION

The annual meeting of the Canadian Brown Swiss Association was held at Ayer's Cliff, Que.

The following are a list of officers for the year 1917: President, C. E. Standish;

vice-president, W. A. Jolly; secretary, Ralph H. Libby; directors, Ralph Ballagh, Guelph, Ont.; Arthur Galey, Hatley, Que.; Amedee Brault, Coaticook, Que.

THE DOMINION GRANGE

At the 42nd annual convention of the Dominion Grange, held in Toronto on February 28th, the following officers were elected for the ensuing year; Master, J. C. Dixon, Moorefield; Overseer, Jno. McDonald, Bentpath; Secretary-Treasurer, Neil Burton, Apple Grove; Chaplain, W. McCrea, Guelph; Lecturer, Henry Glendinning, Manilla; Steward,

Wm. Oke, Whitby; Assistant Steward, Jno. Pritchard, Gorrie; Gate Keeper, W. C. Leeson, Aylmer; Ceres, Mrs. Wardell, Middlemarch; Pomona, Miss Thompson, Palmerston; Flora, Miss Philp, Whitby; Lady Assistant Steward, Miss Hill; Executive Committee: W. E. Wardell, J. J. Morrison, Jno. A. Carswell and the Master and Secretary.

THE PRINCE EDWARD ISLAND DAIRYMEN'S ASSOCIATION

The eighteenth annual convention of the above association was held in Charlottetown on Feb. 28th and Mar. 1st, 1917.

The officers appointed for 1917 are:

President, Rev. Dr. Gauthier, Palmer Road; vice-pres., M. Horne Wright, Bedeque; secretary, Mr. J. Walter Jones, Hazelbrook.

NEW BRUNSWICK FARMERS' AND DAIRYMEN'S ASSOCIATION

At the annual convention of the New Brunswick Farmers and Dairymen's Association, held in Fredericton, January 29 to February 2, Isaac Baird, Chipman, was elected president; R. R. Patchell, St. John,

Vice-President; C. M. Shaw, Hartland, recording-secretary; A. R. Wetmore, Clifton, corresponding-secretary and H. H. Smith, Hoyt Station, treasurer.

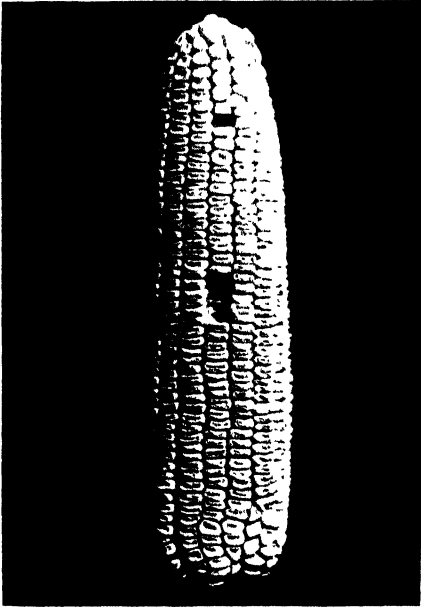
THE NOVA SCOTIA FARMERS' ASSOCIATION

The officers of the Nova Scotia Farmers' Association for 1917 are: President, Wm. Murray, Union Centre; first vice-president, Samuel Freeman, Amherst;

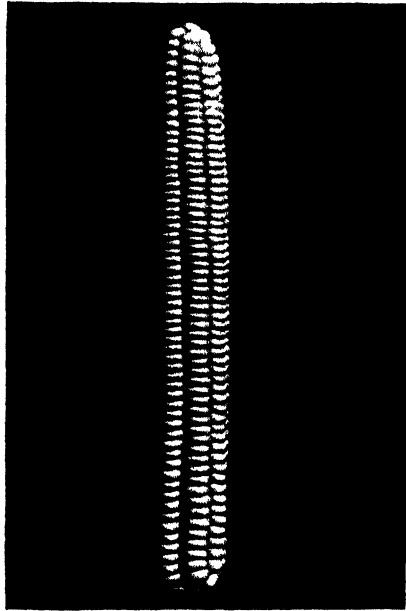
second vice-president, Ronald McDonald, Ohio; secretary-treasurer, C. R. B. Bryan.

THE ONTARIO CORN GROWERS' ASSOCIATION

The 9th annual show and convention of the Ontario Corn Growers' Association, was held in the town of Kingsville, Ontario, from February 13th to 16th, 1917. Three hundred exhibitors made one thousand entries, this being considerably in advance of last year. Besides corn, there were exhibits of different kinds of imple-

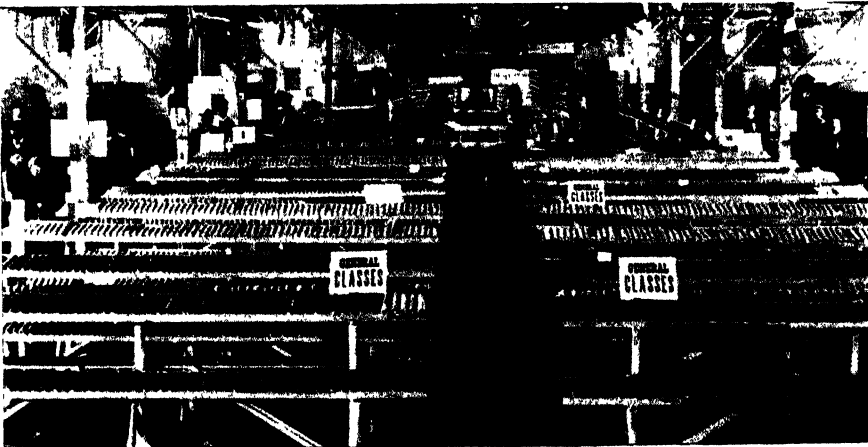


BEST SINGLE EAR, DENT CORN AT THE ONTARIO CORN SHOW



BEST SINGLE EAR, FLINT CORN, AT THE ONTARIO CORN SHOW

ments used in the planting, cultivating and harvesting of the corn crop. During the convention, addresses were delivered by Professor J. D. Harper of Lafayette, Indiana, Dr. G. C. Creelman, Commissioner of Agriculture for Ontario, and Dr. C. A. Zavitz, Ontario Agricultural College, Guelph, on the subject of "Preparations for



GENERAL VIEW, ONTARIO CORN SHOW, KINGSVILLE, ONTARIO, FEBRUARY 13TH TO 16TH, 1917

Crop Production"; by Professor G. E. Day of the Ontario Agricultural College, on "Corn as a Feed", and by Mr. W. E. Saunders, of London, on "Our Feathered Friends". Mr. E. D. Eddy, of the Seed Branch, Ottawa, discussed the seed corn control agreement which was adopted last year and is for the purpose of protecting growers and purchasers of high class seed

corn.

The officers elected for 1917 were as follows: Honourary president, R. W. Knister, Comber; president, L. Gregory, Chatham, Ont.; first vice-president, L. D. Hankinson, Aylmer; second vice-president, W. Anderson, Amherstburg; secretary, J. W. Noble, Essex; treasurer, J. H. Coatsworth, Kingsville.

THE ONTARIO WINTER FAIR

The annual meeting of the Ontario Provincial Winter Fair was held in the secretary's office, Parliament Buildings, Toronto, Thursday, March 1st, 1917.

The following officers were elected: President, W. W. Ballantyne, Stratford; honourary president, William Smith, M.P., Columbus; vice-president, J. I. Flatt, Hamilton; secretary-treasurer, R. W. Wade,

Toronto; Executive Committee: John Boag, Queensville; Peter Christie, Manchester; John Gardhouse, Weston; R. S. Stevenson, Ancaster; John Kelly, Shakespeare; J. I. Flatt, Hamilton; William McNeil, London; A. McKenney, Amherstburg.

Superintendent, J. H. Saunders, London; assistant superintendent, A. Leitch, Guelph.

THE MANITOBA BEEKEEPERS' ASSOCIATION

The eighth annual convention of the Manitoba Beekeepers' Association was held in Winnipeg on February 13th and 14th, 1917.

During the convention addresses were delivered by Mr. G. C. Gunn, the president of the association; Mr. R. M. Muckle, provincial apiarist; the Hon. T. C. Norris, on "Patriotism and Production," and by Mr. A. Stevenson of Morden, on his experiences

and success in fruit growing in Manitoba; papers prepared by Mr. W. H. Hambly, and Mr. F. W. L. Sladen, Dominion Apiarist, were read. The officers elected for 1917 follow: President, G. G. Gunn, Lockport; vice-president, Mr. W. H. Hambly, Roseisle; secretary, R. M. Muckle, Department of Agriculture, Winnipeg; Board of directors: S. A. Bedford, Winnipeg; R. A. Rutledge, St. Charles; S. T. Meighton, East Kildonan.

THE MANITOBA DAIRY ASSOCIATION

At the annual convention of the Dairy Association of Manitoba, held during February in Winnipeg, the following resolutions were passed:—

That the convention go on record as unanimously endorsing the legislation passed at the last session of the legislature in regard to "Cream Buying Stations" and urge the strict enforcement of the Act.

That the cream grades adopted at the last annual convention stand for 1917 and that the creameries co-operate in bringing the same into complete effect.

That the Association recommend to the Department of Agriculture—that another grade of butter be added, to the ones already in use, to be known as "Manitoba Specials" to be made only from properly pasteurized cream.

That the association is more than ever in favour of pasteurizing cream as a

means of producing a higher grade of butter.

That this convention believes that the work of the creamery inspectors should be continued in view of its highly beneficial effect on the industry and the encouragement thereby given to cream grading.

The officers appointed for 1917 were:—

President, Alex. McKay, Winnipeg; 1st vice-president, A. G. P. Smellie, Russell, Man.; 2nd vice-president, J. A. McLachlan, Virden, Man.; secretary-treasurer, W. Weir, Manitoba Agricultural College, Winnipeg.

Directors: J. M. Carruthers, Winnipeg; W. J. Graham, Melita; T. H. Rumball, Miami; L. A. Gibson, Winnipeg; S. Code, Dauphin; Chas. Tully, Reaburn; A. Du-maine, Saltel; E. Dione, St. Joseph; Fred Miller, Miller's Crossing; T. J. Coyle, Winnipeg.

THE MANITOBA HORTICULTURAL AND FORESTRY ASSOCIATION

The twentieth annual convention of the above association was held in Winnipeg on February 15th and 16th, 1917. During the convention joint sessions were held with the Home Economics Societies and with the Agricultural Societies, at each of which many addresses were delivered, bearing upon the work of the societies in session.

Among the resolutions adopted were the following:—

“That whereas considerable difficulty has been experienced in disposing of garden produce to good advantage, be it resolved that this convention strongly recommend to the Dominion and Provincial Departments of Agriculture that some steps be taken to provide adequate storage facilities for vegetables in Winnipeg and at other central points throughout the province.”

“Resolved that this association, humbly

petition the Provincial Legislature to enact at as early a date as possible, a law prohibiting the sale and planting of the bushes of the species known as *Berberis vulgaris*, and the destruction of those bushes already in existence with the exception of such bushes as may be considered necessary or advisable to use in strictly experimental or investigational work, which shall not in any way jeopardize the wheat crop of the province.”

The officers for 1917 are: Honourary presidents, Prof. S. A. Bedford, Department of Agriculture, Winnipeg; Angus Mackay, Indian Head, Sask.; Pres. J. B. Reynolds, Agricultural College, Winnipeg President, Geo. Batho, 406 Maryland St., Winnipeg; 1st vice-president, H. W. Watson, Walnut St., Winnipeg; 2nd vice-president, W. J. Boughen, Valley River, Man.; secretary-treasurer, F. W. Brodrick, Agricultural College, Winnipeg.

THE MANITOBA HOME ECONOMICS SOCIETIES

The convention of the Home Economics Societies of Manitoba was held in Winnipeg, fully 400 delegates representing 94 societies being present. The report of S. T. Newton, Superintendent, showed that there were 94 societies in the province, this being an increase of 16 during the year, while the membership has increased from 2,824 to 3,500.

The short course report from February 1st, 1916, to February 1st, 1917, was as follows:

	Courses	Aggregate Attendance
1. Dressmaking	98	18,871
2. Millinery	58	9,569
3. Home Nursing	35	3,120
4. Cookery,		
demonstrations	210	6,315
5. Canning	119	3,100
6. Miscellaneous	30	1,500

Among the large number of resolutions passed were the following:

War Measures—Whereas, economy is

particularly necessary at this time, and realizing the food value of butter fat and sugar, and the likely scarcity of these commodities, be it resolved that we desire the Government to take the necessary steps to limit the sale of ice cream and iced cakes.

That the Government be asked to restrict the making and selling of ice cream as a war measure so that cream be released for the making of butter, and that more “full milk” be available for the public.

Resolved that the libraries sent out by the Government have been found inadequate for the ordinary society, that we ask the Government to establish a hundred dollar library and to increase their grant to \$50, also to allow the societies a say in selection of these books, also that a smaller percentage be allowed for practical books.

The Advisory Board consists of Mrs. H. M. Dayton, Virden; Mrs. J. M. Watt, Birtle; Mrs. Stewart, Dominion City; Mrs. H. M. Speechley, Winnipeg; Mrs. M. E. McBeath, Headingley, and Mrs. Bond, Roland.

THE BRITISH COLUMBIA BEEKEEPERS' ASSOCIATION

The annual convention of the Beekeepers' Association of British Columbia was held at Vancouver on February 7, when Hon. W. E. Scott, Deputy Minister of Agriculture was elected honorary

president; D. Mowat McKay, president; W. H. Turnbull, Sullivan, vice-president, and Wm. Hugh, Victoria, secretary-treasurer.

THE BRITISH COLUMBIA FRUIT GROWERS' ASSOCIATION

The British Columbia Fruit Growers' Association held its twenty-seventh annual meeting at Victoria on February 13th and 14th, 1917.

The officers of the association for 1917

are as follows: C. E. Barnes, President, Walhachin; J. E. Reekie, vice-president, Kelowna; R. M. Winslow, Secretary, Box 968, Victoria.

THE BRITISH COLUMBIA STOCK BREEDERS' ASSOCIATION

The annual convention of the British Columbia Stock Breeders' Association was held during the week of February 15th. Addresses were delivered by Professor J. A. McLean of the University of British Columbia, on the subject of "Fundamentals in Live Stock Breeding"; by Mr. T. R. Arkell, of the Live Stock Branch, Ottawa, on "Wool Growing and Marketing".

The officers elected for the ensuing year are as follows: Honourary president, T. W. Paterson, Victoria; president, A. D. Paterson, Ladner; honourary vice-presidents,

Dr. S. F. Tolmie and Deputy Minister W. E. Scott; vice-president, Alex. Davie, Ladner; honorary directors, R. M. Palmer, Cowichan Bay, H. S. Rolston, Vancouver, D. E. Mackenzie, New Westminster; directors, G. W. Sangster, P. H. Moore, J. A. Turner, Victoria; Capt. J. Erskine, Eburne; E. D. Barrow, Chilliwack; Samuel Smith, Dewdney, George Heggie, Vernon, J. B. Tiffin, Ashcroft, T. B. Ward, Douglas Lake; secretary and treasurer, Prof. W. T. Macdonald.

CO-OPERATIVE WOOL MARKETING IN ALBERTA

Mr. E. L. Richardson, Secretary of the Alberta Sheep Breeders' Association has issued a circular to sheep breeders in the province, announcing that the association will continue the handling of wool as during the past three years. It will as usual be graded by experts provided by the Live Stock Branch of the Dominion Department of Agriculture. The circular embodies a blank form on which the wool grower agrees to market his wool through the association either at Calgary, as was done in former years, or to an Eastern representative in case bids made at Calgary are not satisfactory. It is pointed out that each grade of wool is sold on its merits and that

no commission is charged for selling. The actual expenses in connection with grading and selling is deducted from each lot according to the number of pounds sold. Last year this amounted to one cent per pound, when more than 40,000 fleeces brought an average price of 29.9 cents per pound. On the return of the forms, the necessary wool bags, paper twine and shipping tags will be sent to each seller from the office of the secretary at Calgary.

The circular contains directions for caring for sheep in order to produce a good quality of wool and also for preparing and packing the wool.

OTTAWA VACANT LOT ASSOCIATION

A Vacant Lot Association has been formed in the city of Ottawa under the patronage of the Duke of Devonshire, Governor-General of Canada and the presidency of Sir Henry Drayton, Chairman of the Railway Commission. The secretary is Mr. A. S. Jost. The association was organized by the Ottawa Horticultural Society for the purpose of taking over, preparing and allotting vacant land for the free use of citizens of the Capital. The organization includes a number of prominent men and

women as vice-presidents; a committee of expert advisers and an advisory council of two representatives from each of a large number of organizations, such as the Canadian Clubs, Soldiers' Wives' League, the Rotary Club, Returned Soldiers' Association and the Ottawa Horticultural Society. It also has a small board of management. Of several hundred acres of land offered to the association it is expected that about 75 in various parts of the city will be devoted to gardening.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF
AGRICULTURETHE DOMINION EXPERIMENTAL
FARMS

Preparing Poultry Produce for Market by F. C. Elford, Dominion Poultry Husbandman, is Bulletin No 88 of the Dominion Experimental Farm series, and contains the results of close study in the Poultry Division at the Central Experimental Farm and on a number of the Branch Farms and Stations, along such lines as the guaranteeing of the freshness of eggs, the packing of them in attractive cartons, the proper fattening, killing and dressing of poultry, etc. Many illustrations aid materially in making clear the proper methods of handling poultry produce.

Twenty-ninth Annual Report, being for the year ending March 31st, 1916, Vol. 1. As for the previous two years the annual report of the Experimental Farms for the year ending March 31st, 1916, is divided into two volumes and two sections. Volume 1., Section A, is devoted to the report of the Director, Mr. J. H. Grisdale, B. Agr., with general notes and synopses of the work of the various Divisions, Branch Farms, Stations and Sub-stations. Section B, of the same volume, contains reports from the Divisions of Chemistry, Field Husbandry and Animal Husbandry. While the work has necessarily been handicapped by enlistments, the operations of the farms and stations generally have not been to any considerable extent retarded, although the Dominion Chemist, Doctor of Science Frank T. Shutt, states that he has had to relinquish for the time being certain investigations and lines of research. He also says that increased demands from farmers for chemical assistance and investigations made necessary by war conditions have materially added to the labours of the Division. The report of the Acting Assistant Dominion Field Husbandman, Mr. W. L. Graham, deals with weather conditions, crop yields, rotation of crops, cost of production of field crops, weed eradication, use of barnyard manure and commercial fertilizers, irrigation and under-drainage, clearing land, fencing, etc. The Dominion Animal Husbandman, Mr. E. S. Archibald, records a very successful year in live stock work in all the Experimental Farms. The volume comprises 598 pages and a large number of illustrations of farm scenes, typical animals and implements.

THE PROVINCIAL DEPARTMENTS OF
AGRICULTURE AND OF EDUCATION

QUEBEC

A directory or list of breeders of pure-bred poultry in the province of Quebec has recently been issued by the Department of Agriculture. This is bulletin No. 35 of the Department.

The Work of the Plot of Ground is the title of Circular No. 21, issued by the School Garden Section, Horticultural Service of the Department of Agriculture. This circular is in the form of an appeal to the patriotism of school gardeners, prepared and issued by J. H. Lavoie, Chief of the Horticultural Service. School gardeners are asked to devote all of their spare moments to the cultivation and maintenance of the school garden, to strive to improve methods of cultivation and to grow only those products which head the list of human foods.

Seizième rapport général de la caisse populaire de Lévis.—This institution of co-operative credit records another year of progress in 1916. The amount of shares has been increased by \$4,865.00 and the amount of savings by \$92,838.88. The loans made during the year number 1,067, representing a total of \$354,304.30.

"La caisse populaire de Lévis" was established in the city of that name sixteen years ago by Mr. Alphonse Desjardins. Forty-nine loans amounting to \$3,667.21 were made during the first year; in 1916, the number of loans was 1,067, amounting to \$354,304.30. The total number of loans made during the sixteen years is 9,912 amounting to \$2,207,139. The total amount of assets is now \$549,000.

From very modest beginnings—the first deposit was the sum of ten cents—this useful institution has had sixteen years of rapid and uninterrupted progress, showing the soundness of the principles on which it is established. Its branches now cover several provinces of Canada and legislative measures providing for its establishment have recently been passed in several States of the Union.

ONTARIO

Diseased Mouths a Cause of Ill-health by Arthur Day, D.D.S., is bulletin 242 of the Ontario Department of Agriculture and is issued by the Women's Institutes Branch. This bulletin points out the importance of hygiene and personal cleanliness in general, as well as the importance of hygiene and cleanliness in the mouth.

Home Garden and Canning Campaign. The Women's Institute Branch of the Ontario Department of Agriculture has recently published an eight-page pamphlet outlining the Home Garden and Canning Campaign for members of the Women's Institutes. The pamphlet not only outlines the campaign for increased vegetable production but gives directions relative to the cultivation of the garden, with specific directions for the cultivation of the various vegetables.

SASKATCHEWAN

Rural Education Monthly. This is a new publication, No. 1 being published in January, 1917, by the Saskatchewan Department of Education in the interest of practical education throughout the province. Its pages will be devoted principally to such phases of school work as agriculture, school gardening, nature study, domestic science and allied topics.

The first issue contains brief articles relative to nature study, school gardening, school agriculture, household science, improvement of school grounds, manual training and bird houses. Each of these subjects is treated in such a manner as to provide help and assistance to the teachers.

The Rural School Luncheon is Household Science Circular No. 1 of the Department of Education, Saskatchewan. It is stated in the opening paragraph of this circular that in the province of Saskatchewan 58.1 per cent of the school children attend the rural school and the greater number of these on account of living long distances from school bring lunches which are eaten at the noon hour. In order that these children may secure the greatest degree of comfort and encouragement while in attendance at school, the rural school lunch movement has been inaugurated, tried and proven a success. This circular points out the necessity for warm lunches at the noon hour, the equipment required and cost of installation of the same, and gives in detail the organization of the pupils under the direction of the teacher to carry out this work. The circular, which is suitably illustrated, concludes with a number of recipes suitable for hot dishes for the noon-day lunch.

BRITISH COLUMBIA

A directory of poultry breeders in British Columbia has been issued as Bulletin No. 6 by the British Columbia Poultry Association.

Patriotism and Production in Public and High Schools of British Columbia for 1917 is the title of Circular No. 7, issued by the Department of Education. This circular states that the most readily available and

most universal means to be adopted in the concerted effort to increase production is the cultivation of a plot of ground and offers timely suggestions with regard to the cultivation of small gardens. Other lines of suggested work are the raising of a flock of chickens, ducks, geese, or other poultry; the raising of rabbits, pigeons or other pet stock; the raising of a pig, cow, calf or sheep; manual training work, domestic science work and the earning of wages on Saturdays and during the summer holidays. All the schools in the province are being asked to take a special interest in this patriotism and production campaign, so that it may be a success.

Field Crops and Seed Competitions, by H. O. English, B.S.A., Chief Soil and Crop Instructor is Bulletin No. 73 of the Department of Agriculture. In addition to announcing the field crop and seed competitions for 1917, this bulletin includes a report of a "Cost of Production Survey" conducted in 1916; an announcement and prize list of the provincial seed fairs to be held at New Westminster and Armstrong in December, 1917; a list of the prize-winners at the provincial seed fairs held in 1916 and an extended report of the 1916 field crop competitions, of which there were 85, conducted by 55 institutes and including 616 competitors.

Boys' and Girls' Competitions, Bulletin No. 75, prepared by the Live Stock Branch, Department of Agriculture. Boys' and girls' potato-growing competitions were conducted in British Columbia in 1914, extended in 1915 and 1916 and, as announced in this bulletin, will be further extended during the present year. Five competitions are provided for, namely; potato growing, corn growing, pig raising, poultry raising and calf raising. The bulletin also contains hints re organization of boys' and girls' clubs, the general and special regulations governing each competition, and a list of the 1916 winners.

Instructions re Co-Operative Variety Tests, Agricultural Department Circular No. 13, issued by the Soil and Crop Division of the Live Stock Branch. Seed variety testing work has been undertaken in British Columbia for the purpose of securing definite information relative to the varieties of the different field crops best suited to the various districts of the province. Free seed samples are distributed by the Department to recommended members of farmers' institutes, or where there are no institutes, to farmers subject to the approval of the Department. Circular No. 13 is issued in connection with these tests and gives to the experimenter instructions in the preparation of the soil and growing of wheat, oats, barley, corn, sugar beets, potatoes and flax.

NOTES

Mr. W. I. Smale, Brandon, Man., President of the Western Canada Fairs Association, has been appointed successor to Mr. Geo. H. Grieg, as secretary of the Live Stock Associations of Manitoba.

N. C. MacKay, B.S.A., District Representative of the Ontario Department of Agriculture in Bruce county, recently organized an Alfalfa Seed Association, which decided to specialize in the growing of alfalfa for seed and to sell same through one secretary.

The Board of Trade and Councils of Sault Ste. Marie and Steelton, Ontario, are doing everything in their power to encourage home, vacant lot, and backyard gardening in the two towns. The school boards of the same two towns are also giving every encouragement to the children of the schools to take a part in the gardening movement.

The Vancouver Island Flockmasters' Association has announced the co-operative handling of wool and with this announcement has issued details for shearing and for packing wool, also instructions to flockmasters intending to sell wool co-operatively through the association. During 1916, sixty-seven members of the association sold 16,635 $\frac{1}{2}$ pounds of wool co-operatively.

A Women's Gardening Association has been formed in the city of London, Ontario, for the purpose of encouraging women to grow vegetables in their back-yards. The association has been offered vacant land in different parts of the city. Successful amateur gardeners have offered to give two or three hours a week of instruction and assistance to beginners. The Ontario Government District Representative situated at London is assisting with advice when requested, and delivered a public address on vegetable growing on March 5th. The membership fee is fifty cents. It is proposed to charge a small additional fee to employ a man to plough and fertilize the land for the members in each district. Buying the best seed in quantities and selling it to the members at cost, is under consideration. A shop has been lent to the patriotic association, where members having a surplus of vegetables may sell on non-market days by paying a small fee. Prizes will be given for the best managed back-yard gardens or squares and for collections of vegetables. The association is working in co-operation with the City Council, which is taking a keen interest in the subject of growing vegetables on city lots.

The British Columbia Department of Agriculture has announced that field crop competitions will be conducted during 1917 under the auspices of farmers' institutes. The regulations covering these competitions require that there must be at least eight *bona fide* entries for each kind of crop for which a competition is provided, that at least \$30 must be offered in prizes, as follows: (1) \$10, (2) \$8, (3) \$6, (4) \$4, (5) \$2. Of this amount the farmers' institute conducting the competition will be entitled to a grant of \$25 for each competition conducted. In addition to these monetary prizes special district and provincial prizes are being offered.

At a meeting in the City Hall, Ottawa, to which the Governor-General lent his approval by letter, and which was attended by leading government officials and other influential citizens the following resolution was passed:

"That this meeting heartily approves of the campaign now being conducted by the Dominion Department of Agriculture, and by the Organization of Resources Committee for Ontario in favour of increased farm production, and with the view to assisting in this movement would strongly urge that all patriotic organizations, agricultural and horticultural societies, boards of trade, etc., take the lead in the work of organization in their respective localities to procure much needed farm help; further, this meeting would strongly urge that retired farmers should as far as possible revert to farm work during the summer; that as regards the shortage of farm labour in the immediate vicinity of the capital this meeting extends a cordial invitation to the staff of the Central Experimental Farm to co-operate with the Ontario Department of Agriculture and Labour in procuring additional farm help with the full knowledge that such assistance will be forthwith coming."

Another resolution was passed appointing the following committee to aid as far as possible in furthering the policy previously outlined:

W. J. Black, Commissioner under THE AGRICULTURAL INSTRUCTION ACT; J. H. Grisdale, Director Dominion Experimental Farms; G. H. Clark, Seed Commissioner; R. B. Whyte, L. H. Newman, E. A. Caldwell, W. D. Jackson, and Lt. Crean, Superintendent of the Ontario Employment Bureau, Ottawa.

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- The Farm and Dairy and Rural Home*, Toronto, Ont., March 15, 1917.
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- The Maritime Farmer*, Sussex, N.B., March 6, 1917.
 Potato Selection and Disease Control—Address given before the Farmers' and Dairymen's Convention, by Professor G. C. Cunningham, page 285.
 What the Department of Agriculture is Doing for the Women of New Brunswick, page 334.
- The Saturday Press and Prairie Farm*, Saskatoon, Sask., March 10, 1917.
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 Value of Pastures in Pork Production, W. C. McKillican, Supt. Brandon Experimental Farm, pag. 249.
 Cultural Methods in Wheat Production. Some interesting Results from the Season of 1916. Professor T. J. Harrison, M.A.C., page 252.
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- The Grain Growers' Guide*, Winnipeg, Man., March 14, 1917.
 Preparing Machinery for Spring, R. Milne, Department of Agricultural Engineering, Manitoba Agricultural College, page 443.
- Farmer's Advocate and Home Journal*, Winnipeg, March 14, 1917.
 A New Educational Force, page 109.

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May, 1917

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

Issued by direction of
THE HONOURABLE MARTIN BURRELL
Minister of Agriculture

OTTAWA
GOVERNMENT PRINTING BUREAU

1917

CONTENTS

Increased Food Production Campaign.	PAGE 337
---	-------------

PART I

THE DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
The Division of Botany:	
The Mosaic Disease of Potatoes, by Paul A. Murphy.	345
The Division of Horticulture:—	
Variety Testing at the Dominion Experimental Farms and What Has Been Accomplished by It, by W. T. Macoun	349
Experimental Station, Fredericton, N.B.: —	
The Cost of Growing Potatoes	354
The Entomological Branch:—	
The Introduction into Canada of the Ichneumon Fly, <i>Mesoleius Tenthredinis</i> , A Parasitic Enemy of the Larch Sawfly, <i>Nematus Erichsonii</i> , by C. Gordon Hewitt	355
Corrections in Entomological Records	357
Dominion Department of Agriculture Honour Roll	358
The Seed Branch:—	
Lawn Grass Mixtures, by John R. Dymond	359
Weed Seed in Western Grain	360
The Live Stock Branch:—	
The Late John Bright	361
The Development of the Swine Raising Industry	362
The Health of Animals Branch:—	
Infractions of Quarantine Regulations	362

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Short Courses in Agriculture and Home Economics:—	
Prince Edward Island:	
Short Courses in Agriculture, by W. J. Reid	363
Short Courses in Household Science, by Miss Hazel Sterns	365
Nova Scotia, by M. Cumming	366
Dairying Course for the Maritime Provinces	366
Quebec, by F. N. Savoie	367
Macdonald College	369
Ontario:	
The Ontario Agricultural College, by S. H. Gandier	370
Four to Six Weeks' Courses in Agriculture, by C. F. Bailey	373
Short Courses in Stock Judging, by Geo. A. Putnam	376
Manitoba, by S. T. Newton	377
Courses in Home Economics	380
Two Months' Short Course in Farm Engineering, by J. B. Reynolds	382
Short Courses in Dairying, by E. H. Farrell	383
Saskatchewan, by S. E. Greenway	384
Agricultural Short Courses at Normal Schools, by W. W. Thomson	385
Alberta, by Alex. Galbraith	385
British Columbia, by S. H. Hopkins	386
Farm Labour:—	
Nova Scotia, by Arthur S. Barnstead	387
Quebec, by J. A. Grenier	387
Ontario, by W. A. Riddell	388
Saskatchewan, by F. H. Auld and Thos. M. Molloy	390
Farm Labour Conference	390
Alberta, by H. A. Craig	391
British Columbia, by Wm. E. Scott	392

New Brunswick:—	
Secretary for Agriculture Appointed	393
Quebec:—	
Poultry Fattening and Co-Operative Selling, by Rev. Bro. Liguori.	394
Notes	395
Ontario:—	
The Organization of Resources Committee, by Albert H. Abbott	396
Horticultural Experiment Station, Vineland:	
Vegetable Seed Production.	397
British Columbia:—	
Cost of Production Survey.	398
Notes, by J. Roy McLennan.	399

PART III

RURAL SCIENCE

Household Science in Normal Schools:—	
New Brunswick, by Hedley V. Bridges	400
Ontario.	400
Ottawa Normal School	401
Stratford Normal School, by S. Silcox	401
Hamilton Normal School, by S. A. Morgan	401
Saskatchewan:—	
Household Science Instruction, by Miss F. A. Twiss	402
Saskatoon Normal School, by Mrs. E. B. Rutter	403
Normal School, Regina, by Miss Helen McMurtry	404
Alberta:—	
Provincial Normal School, Calgary, by E. W. Coffin	405
Normal School, Camrose, by Margaret A. Stewart	406

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Agricultural Legislation:—	
Federal and Provincial Acts for the Suppression and Control of Insects, Pests and Diseases Injurious to, or Destructive of, Vegetation	408
Societies and Associations	412
New Publications	413
Notes.	417
Index to Periodical Literature	420

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence	421
Science and Practice of Agriculture	422
Agricultural Economics:	
The Danish Co-Operative Societies for the Export of Eggs	430
Co-Operative Marketing of Live Stock in Wisconsin	432
Land Settlement of Ex-Service Men in England.	432
Institution of an Autonomous Ministry in Italy	433
Contents of the Institute Economic Bulletin.	433
Agricultural Statistics:—	
Influence of the Severe Winter upon the Crops.	434
The World's Trade in Wheat and Flour	435
The World's Supply of Cereals.	435
Crop Cable from the Institute.	436
Numbers of Live Stock.	436

The Agricultural Gazette

OF CANADA

VOL. IV

MAY, 1917

No. 5

THE AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at \$1.00 per annum, or 10 cents per copy.

Subscriptions should be forwarded to the Editor, Agricultural Gazette, Ottawa.

INCREASED FOOD PRODUCTION CAMPAIGN

EVER since last harvest the Dominion Department of Agriculture has been unceasingly active in its endeavours to solve certain difficulties that menace farm production. The successful work of the Seed Grain Commission is but one of the many forms of assistance rendered.

The interesting set of advertisements here reproduced followed a special patriotic appeal made by the Honourable Martin Burrell for a united national effort to increase the food supply both for home and overseas. In this appeal strong emphasis was laid on the important and special service that agriculture could render at this critical stage of the war. In spite of the difficulties confronting them, farmers were urged to do their utmost to maintain farm output. Not only to farmers was this appeal addressed—urban dwellers were called upon to help on the land and to augment the general store of food by growing vegetables and keeping poultry. In a letter to the mayors of cities and towns the Minister invited their assistance in organizing public-spirited citizens for the promotion of these objects.

The first advertisements appeared early in March, and were designed to give emphasis to the Minister's appeal. These were followed by three in the interest of poultry-raising. One of the latter advises urban residents to endeavour to supply their own needs in the way of eggs by utilizing table waste in the maintenance of a small flock of hens. Two are directed to farmers and point to the necessity for increasing the output of Canadian eggs in order to meet Great Britain's requirements. An attractive poultry poster or "hanger" in three colours was also distributed and displayed in post offices, banks and railway stations throughout the country.

On the seven succeeding pages appear fac-similies of the advertisements referred to in the foregoing:

BRITAIN— CALLS TO CANADA—

THE FACTORY

THE FARM

She must have food—

for her Armies in the Field—for her Workers in the Factory—in the Munition plant—in the Shipyard—in the Mine.

There's Danger In Sight—But You Can Help

DO YOU KNOW—

that the rapidly rising price of food stuffs means that the World's reserve supply is getting small?

DO YOU KNOW—

that a world-wide famine can only be averted by increasing this supply?

DO YOU KNOW—

that a "food famine" would be a worse disaster to the Empire and the Allies than reverses in the Field?

YOU CAN—

help thwart Germany's desperate submarine thrust on the high seas.

YOU CAN—

do this by helping to make every bit of land in Canada produce—the very last pound of food stuffs of which it is capable.

AND REMEMBER—

that no man can say that he has fully done his part—who having land—be it garden patch, or farm, or ranch—fails to make it produce food to its utmost capacity.

THESE FARM PRODUCTS ARE NEEDED FOR EXPORTS

WHEAT,
OATS,
BEEF,
BACON,
CHEESE,
EGGS,
BUTTER,
POULTRY,
BEANS & PEAS
WOOL,
FLAX AND
FLAX FIBRE,
DRIED
VEGETABLES

Britain appeals to Canada

THE NEAREST PRODUCER OF STAPLE FOODS

India and Argentina are more than twice the distance away and Australia more than four times.

Canada to Britain	2625 Miles
India & Argentina to Britain	6000 Miles
Australia to Britain	11500 Miles

"No matter what difficulties may face us, the supreme duty of every man on the land is to use every thought and every energy in the direction of producing more—and still more."

Martin Burrell—Minister of Agriculture

The Department invites every one desiring information on any subject relative to Farm and Garden, to write—

INFORMATION BUREAU

DOMINION DEPARTMENT OF AGRICULTURE

OTTAWA

Keep up the Food Supply and Help Make Victory Sure

"I AM assured that my people will respond to every call necessary to the success of our cause—with the same indomitable ardour and devotion that have filled me with pride and gratitude since the war began."

HIS MAJESTY KING GEORGE.

OUR soldiers must be fed; the people at home must be fed. And—in spite of Germany's murderous campaign to cut off the Allies' Food Supply, by sinking every ship on the High Seas—an ample and unfailing flow of food to England and France must be maintained.

*This is National Service—Not to the Farmer only—
But to YOU—to everybody—This appeal is directed.*

WE must unite as a Nation to **SERVE**—to **SAVE** and to **PRODUCE**. Men, women and children; the young, the middle aged and the old—all can help in the Nation's Army of Production.

EVERY pound of **FOOD** raised helps reduce the cost of living and adds to the Food Supply for Overseas.

PLANT a garden—small or large. Utilize your own back yard. Cultivate the vacant lots. Make them all yield food.

WOMEN of towns can find no better or more important outlet for their energies than in cultivating a vegetable garden.

For information on any subject relating to the Farm and Garden, write:

**INFORMATION BUREAU
Department of Agriculture
OTTAWA**

*Be patriotic in act as
well as in thought.*

*Use every means available—
Overlook nothing.*

**Dominion Department of Agriculture
OTTAWA, CANADA.**

HON. MARTIN BURRELL, Minister.

SERVE—SAVE—PRODUCE

EVERY ONE CAN do something for his country

Some can bear arms
Some can produce food
Some can make munitions
Some can give money—*It is the privilege of all to help.*

YOU CAN SERVE by Fighting—Working—Saving
Giving

This is NATIONAL SERVICE Are YOU doing your part?

ALL EYES turn now to the Canadian Farmer,
for he can render the Empire **SPECIAL SERVICE**
in this sternest year of the war.

But — our farms are badly undermanned— 25,000 men are
needed on the land.

With insufficient help, the Man on the Land fights an uphill
fight to meet the pressing need for Food.

CITY and TOWN can help.

Municipal Councils, Churches and Schools, and other organizations,
both of men and women, can render National Service
by directing all available labour to the Land.

Farmers themselves can exchange labour. School boys can
assist.

Were you raised on a farm? Can you drive a team? Can you
handle fork or hoe? If you can't fight, you can produce. Spend
the Summer working on the farm.

Let every man, woman and child in the Dominion who has
access to Land, no matter how small the plot, make it produce
Food in 1917.

For information on any subject relating to
the Farm and Garden write: —

INFORMATION BUREAU
DEPARTMENT OF AGRICULTURE
OTTAWA

DOMINION
DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA.

HON. MARTIN BURRELL, Minister.

Forward to Victory

Mobilize Farm Forces for Production!

TO RAISE ARMIES is not enough—
they must be fed.

Vast quantities of staple foods are needed for overseas.

Wheat, Oats, Beef,
Eggs, Butter, Poultry,
Wool, Flax and Flax Fibre.

Bacon, Cheese,
Beans and Peas,

THE CANADIAN FARM can render NATIONAL SERVICE by keeping up the Food Supply.

Tremendous demand, scarcity of labour and high cost of seed insure against over-production.

THIS YEAR It will pay to

Save the choice calves
Breed all good heifers
Keep an extra sow
Rear another brood of chicks

Save time and labour by planning the year's work

Every extra effort helps.

REMEMBER it always pays to

Test seed for vitality
Sow clean, plump seed
Treat wheat, barley and oats for smut
Sow only on properly prepared land
Grow the best producing varieties

NO matter what difficulties may face us, food production is a supreme duty.

A great cause—

A sure reward—

A grand opportunity.

If you need information on any subject connected with the farm, write

INFORMATION BUREAU

DOMINION DEPARTMENT OF AGRICULTURE

OTTAWA

HON. MARTIN BURRELL, Minister.

Keep Chickens

*This is
National
Service*



**They
will help
Keep you**

The cost of meat is the heavy item in the food bill.

Poultry and Eggs will help take the place of meat.

The food that goes to the garbage pail from the average table will provide one-third the feed for a flock of 8 to 10 hens.

Poultry will thrive where vegetables will not grow. The outlay is small. A few minutes a day is all the time required.

A small flock in your back yard will go far to keep you supplied with eggs, broilers and roasters.

How to go about it

BUY eggs for hatching or day-old chicks; borrow or buy a broody hen or an artificial brooder. A slatted packing-box will house the hen and chicks. Feed the chicks bread crumbs soaked in milk and squeezed dry. Feed five times a day, alternating with prepared chick feed, only as much as they will eat up clean. Remember that a hungry chick is a healthy chick.

CAUTION Chicks must not be fed until at least 48 hours old, and then only sparingly.

If you can, start now with eggs or chicks; if not, arrange at once with the local poultry association for pullets in the fall.



Write for Poultry Bulletins to

INFORMATION BUREAU

**THE DOMINION
DEPARTMENT OF AGRICULTURE,
OTTAWA**

HONOURABLE MARTIN BURRELL, *Minister*

Raise

*"There's Money
in hens"*

Poultry



To increase
the Nation's
Food Supply

This is a Patriotic National Duty

10,000,000

Ten million more hens are
needed to meet the home and
overseas demand for eggs.

That means 15 more
hens on every farm in Canada.

Raise two additional
broods of chicks and let the
hen help you increase pro-
duction.

Every pound of food
produced helps defeat the
enemy.

Britain makes insistent
demand for eggs at high prices.

Patriotism and profit
both urge you to increase the
supply.

Let the hen help you.

Interest your boy
and girl in poultry keeping.

*If you need information on any subject connected
with poultry raising and marketing, write,*

THE INFORMATION BUREAU,
DOMINION DEPARTMENT OF AGRICULTURE,
OTTAWA.

HONOURABLE MARTIN BURRELL, Minister



Seize this Export Market Opportunity

*In 1916, Great Britain Imported
66,064,110 dozen eggs*

TO that total Canada contributed 14,317,780 dozen—of which 7,363,290 dozen were United States eggs. Therefore Canada's net contribution was only 6,954,490 dozen domestic eggs.

CANADA'S eggs are of First Class quality and hold a high reputation in the British market.

THE present is a most opportune time to secure a permanent share of this trade.

TO do so, we should increase the output by at least 10 MILLION DOZEN.

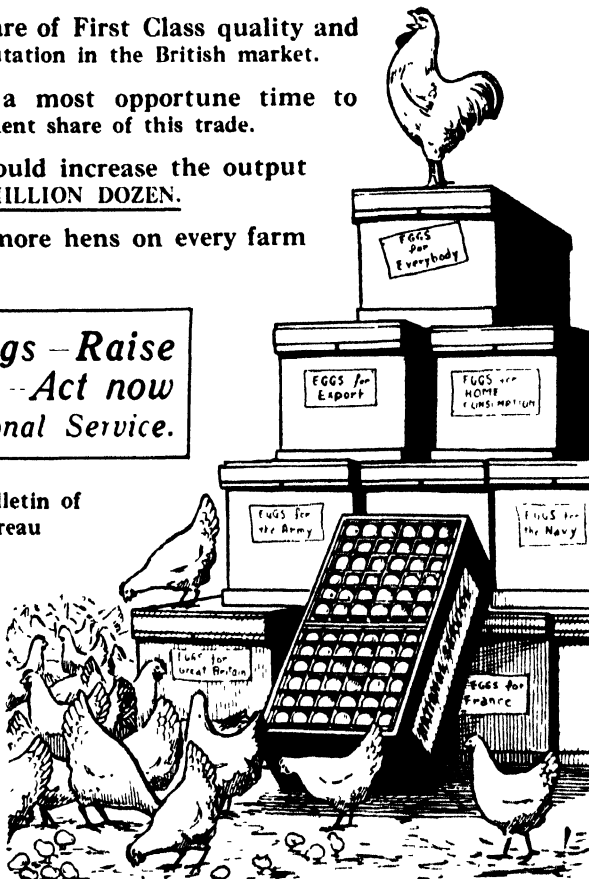
THIS means 15 more hens on every farm in Canada.

*Set more eggs — Raise
more chicks — Act now
— This is National Service.*

Ask for Poultry Bulletin of
Information Bureau

**DOMINION
DEPARTMENT OF
AGRICULTURE,
OTTAWA.**

HON MARTIN BURRELL,
Minister



PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF BOTANY

THE MOSAIC DISEASE OF POTATOES

BY PAUL A. MURPHY, OFFICER IN CHARGE, PLANT PATHOLOGICAL LABORATORY,
CHARLOTTETOWN, P.E.I.

THE Mosaic disease of potatoes is not generally recognized by farmers, or the extent of the loss it causes appreciated. Particularly in the potato-raising sections of the Maritime Provinces in which the Green Mountain variety is largely grown the ravages due to this disease form a large and steady drain on the profits of the industry. The Plant Pathological Laboratory for New Brunswick estimates that ten per cent of the value of the potato crop in that province is lost each year as a result of the disease. Calculating the New Brunswick losses on the basis of 1916 prices, this would amount to about \$768,900. The same would hold good for all the neighbouring provinces where varieties liable to the disease are generally grown.

Mosaic is easily recognized once one knows what to look for. If an average field of Green Mountain potatoes be examined, say at the end of July or thereabouts, there will be noticed a certain proportion of plants with leaves not so smooth as those of other plants nearby. The foliage, instead of being a smooth glossy

green, is somewhat wrinkled or corrugated. The feature varies considerably, being very marked in some cases and not so marked in others, but it is always present to such an extent as to be easily recognized. These wrinkled leaves will on closer examination be found to be mottled with faint light green or yellowish spots. The spotting is also variable, but it can generally be seen, particularly if the observer stands in such a position as to place the plant being examined in his shadow. Occasionally it is strikingly evident, depending on the severity of the attack and also apparently on the weather conditions at the time of the examination. Diseased plants often show more bare stalk near the ground than normal ones, partly because the affected foliage does not spread out and droop down as in the normal case, and partly because the lowest leaves sometimes fall off in the last stages of severe attacks. No other marks will be found on any parts of the affected plants, or on the tubers. The latter are normal looking and sound, and their keeping or eating qualities are not impaired. From a

casual examination of a few plants in the field the yield does not seem to be reduced materially, but such is not the case, as the experiments to be recorded will show.

The cause of the trouble is unknown. A somewhat similar disease affects other plants of the same family, such as tobacco and tomato. No parasites have been found responsible in any case. In the case of tobacco mosaic, at least, it has been shown clearly

for seed, and this result is borne out by experiments carried out at Charlottetown in 1916. The product of some diseased plants was planted in hill units, and in every case all the plants showed unmistakable symptoms of mosaic, although the severity of the attack varied. In two other experiments tubers from a number of diseased plants were all planted together. In one case every resulting plant without exception



A GREEN MOUNTAIN POTATO AFFECTED WITH MOSAIC

that the sap of mosaic-diseased plants contains an infective principle which when transmitted to healthy tobacco plants reproduces the disease in them. The cause of the malady in potatoes is probably of the same nature, although infection has not been conveyed artificially from one plant to another. It has been proved, however, that infection takes place through the tubers of mosaic plants when used

showed mosaic symptoms in a readily recognizable form, while in the other case, which was on a somewhat larger scale, 77 per cent of the plants showed clear symptoms along with some doubtful ones. An attempt to convey the infection from diseased to healthy tubers by contact of cut surfaces resulted in failure.

Trustworthy data on the yield of mosaic hills in comparison with healthy ones of the same variety and

strain of potatoes are furnished in Table I. They were secured from a quarter-acre plot of Green Mountains which was divided into eleven plots and used for a spraying experiment. During the season it was found that 28 per cent of the plants were mosaic-diseased. It is interesting as bearing on the prevalence of the disease that the seed used was purchased because it was known as a good strain and one particularly free from this very pest. The diseased plants were all very carefully staked during the growing season and at digging time they were taken out

one by one from each of the eleven plots and carefully weighed. When that was done, the healthy plant nearest the place where a mosaic plant had been growing was then dug up, one for every diseased plant. There were thus obtained figures relating to from 55 to 71 diseased plants and the same number of healthy plants, from eleven plots, or 682 individuals of both kinds. The twenty-two lots of potatoes were afterwards graded carefully and the amount of marketable tubers determined.

TABLE I SHOWING THE YIELD OF THE SAME NUMBER OF DISEASED AND HEALTHY HILLS FROM ELEVEN PLOTS OF THE SAME STRAIN OF GREEN MOUNTAINS

	No. of plot	No. of Mosaic hills	No. of healthy hills	Weight of Mosaic hills in lb.	Weight of healthy hills in lb.	Yield of Mosaic plants— the yield of the healthy plants being taken as 100
	1	66	66	76	121 ¹ / ₂	62.6
	2	71	71	64 ¹ / ₂	124	52.0
	3	62	62	63	116	54.3
	4	63	63	75 ¹ / ₂	130	58.1
	5	60	60	70 ¹ / ₂	113	62.4
	6	56	56	61 ¹ / ₂	112	54.9
	7	65	65	68	124 ¹ / ₂	54.6
	8	63	63	66 ¹ / ₂	104 ¹ / ₂	63.6
	9	65	65	62 ¹ / ₂	108 ¹ / ₂	57.6
	10	55	55	44	79	55.7
	11	56	56	36 ¹ / ₂	59	61.9
Totals and averages	11 plots	682	682	688 ¹ / ₂	1192	57.8

From Table I it can be seen that mosaic hills gave less than 58 per cent of yield of normal hills. This result is very constant, ranging only from 52 per cent to 63 per cent. In other words the diseased hills yielded an average of 16 ozs. of potatoes and the healthy hills nearly 28 ozs. Not only so, but as the run of tubers from mosaic plants is small, so that they graded no more than 82.7 per cent marketable, while the healthy hills graded 91.6 per cent marketable, the yield of marketable potatoes from diseased plants is only 52 per cent of the normal. Translating these

figures into bushels per acre, we deduce the result that for an average crop of potatoes of 250 bushels per acre the yield of marketable tubers is reduced about one and one-fifth bushels for every one per cent of mosaic present.

Since the average crop of Green Mountains contains probably from 20 to 100 per cent mosaic, the loss would range from 24 to 120 bushels per acre.

Observations based on another lot of the same potatoes in which there was 30 per cent of mosaic plants lead to the same conclusion. The healthy

hills weighed 1,537 lb. while the mosaic-diseased hills weighed only 392 lb., the diseased plants giving 59.5 per cent of the yield of the normal plants.

Mosaic is perpetuated by planting the tubers from diseased hills. It yet remains to be proved how efficient hill selection will be in eliminating the disease from a susceptible variety. It is possible that some varieties are breaking down to mosaic so quickly as to make hill selection

knowledge of varietal susceptibility, but a promising sort which seems to be immune is the "Cumming's Pride," the tuber of which resembles the Green Mountain very closely. In the meantime growers would do well to avoid using seed from crops badly affected with the disease. Hill selection might be tried and may prove valuable, or growers might make use of the Dominion Potato Inspection Service carried out by the Field Laboratories of



THE PRODUCE OF THE SAME NUMBER OF MOSAIC AND OF HEALTHY PLANTS OF THE SAME VARIETY AND STRAIN AND GROWN UNDER THE SAME CONDITIONS

too difficult to be useful. It is hoped to have more exact knowledge on this point next year when the fifty bushels of potatoes from the healthy plants of the above experiment are planted. If it should prove that a considerable proportion of these plants develop the disease, it may be necessary to look around for some other varieties to replace the most susceptible ones. It is planned to do some more work to further our

Plant Pathology at Charlottetown, P.E.I., and Fredericton, N.B., which can put them in touch with seed growers whose crops have passed a field inspection for this and other diseases.

It will be easily seen from the above account that the mosaic disease of potatoes is of great economic importance. It is most prevalent in Eastern Canada, but has also been observed in fields in the West. The

absence of any symptom of the disease in the seed tuber emphasizes the necessity for farmers to become familiar with the symptoms of the disease in the growing plant and, further, the wisdom of removing the diseased hills from the whole field, or at any rate, from a part of the field, in order to secure a quantity of seed free from the disease. This course is recommended in cases in which the amount of mosaic present in the crop is not excessive. Where the disease assumes serious proportions, as in many strains of Green Mountain, the grower would be wise to obtain fresh seed from disease-free fields. Negligence on the part of the growers towards the elimination of

this disease will afford it every chance for dissemination by the use of seed from infected fields, and thus aid in the decrease of yields which should and can be avoided by the exercise of a little care and action along the lines suggested in the literature on potato diseases published by the Division of Botany. Increased production, as shown by experiments, is to a very large measure due to the combating of diseases affecting agricultural crops. Indeed, we consider it the most essential point, since the use of diseased seed of all kinds of crops will frustrate all other efforts otherwise contributory to increased production.

THE DIVISION OF HORTICULTURE

VARIETY TESTING AT THE DOMINION EXPERIMENTAL FARMS, AND WHAT HAS BEEN ACCOMPLISHED BY IT

BY W. T. MACOUN, DOMINION HORTICULTURIST

IN a country as vast as the Dominion of Canada, where there are many kinds of climates ranging from the arctic and subarctic to that on the west coast of British Columbia, where but few degrees of frost are recorded, it requires many varieties of fruits to meet all conditions. In some parts of the Dominion the summers are warm but the winters cold; in other parts the summer is warm and the winter relatively mild; or again, the summer may be cool and the winter mild, or the summer cool and the winter cold. Spring frosts frequently catch the early-blooming varieties in one district, while in another, the short growing season prevents the full development of the fruit.

TREE TESTS

Before referring to the results obtained from testing varieties of the different kinds of fruits at the Dominion Experimental Farms and Stations, a statement should be made

of the kind of testing which is done. It is the aim to plant at least two trees of each of the varieties of tree fruits which it seems desirable to experiment with. If the prospects of the tree, being a valuable acquisition, are good, more trees are planted. After a variety has been proven to be promising, from eight to twelve trees each of a number of promising sorts are planted side by side with well-tried varieties, in order that a better idea of their commercial value may be obtained than if but two were grown. It has not been considered a good test of a variety to top-graft it, as it is important to learn whether the trunk will withstand sunscald or fire blight, and this can only be learned by growing a tree with its own trunk. It is a temptation, however, to do some top-grafting in order to see what the fruit is like as soon as possible. Records have been kept every year at the Central Experimental Farm, Ottawa, since 1898, of how the trees of each variety winter,

the time when each variety begins to bloom, is in full bloom, and when the bloom has fallen, the kind of crop, whether light, medium, good, or whether there is none. This is followed up by actual measurement of the yield in gallons, the yield being divided between picked fruit and windfalls, several pickings of the latter being usually made. Annual notes are also made of the way and degree in which each variety is affected by disease or insects; the season's growth of each tree is also noted, whether it is weak, medium, or strong, and when the variety has fruited a detailed description is made of the fruit; the keeping quality of the fruit is also determined. Not only are these notes made of each variety, but of each tree of each variety. The same kinds of record books are used at all the farms and stations, and, as far as possible, similar notes are now being taken at most of them, as at Ottawa.

METHODS OF VARIETY TESTING

In testing grapes, two or more vines are planted. One of the most important records kept of grape varieties is the time of ripening, and whether a variety ripens at all or not. Notes are also taken in regard to the blooming season and kind of crop, and descriptions of the varieties are made. Six plants of currants and gooseberries is the minimum number usually used in a test, and twelve plants or hills of raspberries. The hardiness of the plants is recorded, and the length of the fruiting season. Descriptions are made of the fruit. At some of the newer stations rows of currants are alternated with rows of raspberries, to avoid mixing of the varieties from suckers.

The variety test of strawberries is usually conducted on plots consisting of two rows, each 15 feet in length, 20 plants being set out, 10 in each row, the plants being planted 18 inches apart and the rows made 3½ feet

apart. The strawberries are grown by the matted row system. The plants are not thinned out, but the rows are all reduced to two feet in width before growth starts the second spring. Two rows of 15 feet each, rather than one row of 30 feet, are used in order to prevent the possibility of the plants getting mixed, the plants for a new plantation being taken from between the two rows. Large areas are planted of the older varieties and the best of the newer ones. Nearly 700 named varieties of strawberries have been tested during the past twenty-eight years. Some of the more important annual notes made upon the varieties of strawberries are in regard to hardiness, blooming season, character of plant as to vigour and plant-making habit, amount of disease, length of fruiting season and the yield. Finally, descriptions are made as with other fruits.

There is not space to go into the details in regard to each kind of vegetable, ornamental tree, shrub, and ornamental herbaceous plant, suffice it to say that many hundreds of varieties have been tried, and notes taken. In the case of vegetables and annual flowers which are raised from seed, strains play a very important part, and this has to be taken into consideration when deciding on a variety.

RESULTS OF EXPERIMENTS

So much has been said in regard to methods of testing varieties. What can be said of the results obtained? In the case of the apple, which is the most important fruit grown in Canada, and which will be considered first, much useful information has been brought out which may be grouped under various heads.

Hardiness.—The first consideration in regard to a variety in Canada is its ability to withstand the cold or changes of temperature in winter, and hardiness has that meaning here.

When the first Experimental Farms were established in 1887, the great diversity of the climate was realized, and it was felt that one of the most important lines of work that could be undertaken was to determine which varieties were most suitable for the parts of Canada represented by Experimental Farms at that time. There were but five farms established at first, namely, the Central Farm at Ottawa, Ont.; and branch farms at Nappan, Nova Scotia; Brandon, Man.; Indian Head, Sask.; and Agassiz, B.C.; and on these farms were planted large collections of varieties of fruits. A striking example of the result of this first variety testing may be given in the case of the experimental farm at Indian Head, Sask., where, among others of American origin, what were thought to be the hardiest Russian apples were tried. This first testing was done on a practically treeless prairie, but even though shelter belts have grown up, the same varieties have done little better in later years. From the very first, however, the wild Siberian crab apple, *Pyrus baccata*, proved quite hardy, and has continued to bear abundantly. At Ottawa, where the winters are much milder than in Saskatchewan, but where the temperature goes down occasionally to 30° F. below zero, many varieties have been killed by winter. During the past twenty-eight years 734 named varieties, other than those originated here, have been tested. In one winter, that of 1903-4, trees of 164 varieties were killed. This was one of the so-called "test" winters of which only a few are experienced in any one man's life, but which are very valuable from an experimenter's standpoint. There are now 21 experimental stations in Canada under the Dominion Government, where varieties of fruits are being tested and most of the striking climatic conditions are represented in the districts they serve. At sub-stations, and by private individuals scattered

here and there over the country, varieties are being tested at a large number of other places. We are well situated in Canada to determine the relative hardiness of different varieties, as the minimum winter temperature at our farms and stations varies all the way from twenty to nearly one hundred degrees of frost. Results have shown that it is not always the extremely low temperature which kills a variety, but rather continued cold spells. In the winter of 1903-4 for instance, when so many apple trees were killed at Ottawa, there was a very cold spell for twelve consecutive days, on six of these days the temperature going to from 20° to 30° F. below zero. In other winters, when the temperature occasionally drops to from 25° to 30° below, little or no injury to apple trees occurs. Other conditions which cause killing of the trees are low drops of temperature in spring after the buds have begun to swell. It is such conditions which cause the death of many trees on the prairies which have gone through long continued spells of cold weather with little injury. Hardy varieties must then be able to withstand continued low temperature and sudden changes of temperature. It has been learned by the testing of varieties that a very large proportion of those which ripen their wood well before winter sets in are among the hardiest. Trees which have grown late stand little chance of pulling through in a test winter. Most of the summer apples ripen their wood, and most of the commercial summer varieties are hardy at Ottawa, but varieties hardy at Ottawa are not hardy under the more trying winters and springs of the prairie provinces, hence there are degrees of hardiness even among early-ripening trees. It has been found that the greatest hardiness is found among the Russian varieties of apples, no doubt because they are the survivors of many test winters in Russia and perhaps because they are nearly related to the Siberian

crab apple, *Pyrus baccata*, which grows, I understand, very far north in Siberia. In closing these words in regard to the value of testing to determine the hardiness of a variety, mention might be made of the two well known sorts, Fameuse and McIntosh, the latter supposed to be a seedling of Fameuse. Up to the winter of 1903-4 it was supposed by many, and by the writer, that McIntosh was no hardier than Fameuse, if as hardy, but, that winter, McIntosh trees were practically uninjured, while many Fameuse trees were killed. There is a long gradation in hardiness among varieties of apples, between Hibernial at one end and, say, Newton Pippin, at the other. Information obtained in regard to hardiness has been obtained with other fruits as well as the apple. In the case of plums and cherries the trees of some varieties have been found hardy in some districts but the fruit buds were tender, the buds of these fruits being influenced by sudden changes of temperature in winter. Among raspberries it has been found that the canes of certain varieties are liable to kill back badly while others are perfectly hardy. With currants, varieties of the Fay and Cherry types have been found much tenderer than others and are quite unsatisfactory at Ottawa. The plants of some varieties of strawberries kill out badly, while others, such as the Senator Dunlap, Warfield and Crescent, are very hardy.

Yield.—It is only by the careful testing of varieties that the relative yields over a period of years can be obtained. At Ottawa such yields have been kept for nineteen consecutive seasons, and while the number of trees of each variety, in the case of apples, for instance, is small, yet a fairly good idea can be obtained of the time when each variety begins to bear; of the fruiting habit of the tree, and of the yield which one may be expected to obtain in, say, the first ten years' growth of the tree in the orchard, and for longer periods.

While it would obviously be unfair to base acre profits on the performance of two trees, yet it is believed that two trees will give a fair idea of what may be expected from a larger number of the same sort. It is true that we have had about twice the crop over a long period from one of two trees of a variety, than has been obtained from the other in the same orchard and planted at the same time, yet it is believed that the larger yield will come nearer the average for a large number than the smaller, and, as has been stated before, a larger number of trees of each variety is desirable. In the case of small fruits it is believed that five-year averages are desirable before one can speak with a fair degree of certainty in regard to the yield of a variety. On the other hand, a new variety may be discarded in less than that time for other reasons than yield.

Keeping quality.—It is important to grow varieties at the same place and in the same orchard if one is to get the best information in regard to their relative keeping quality. If a large number of varieties is brought from many different places for a keeping test they may have come from quite different summer climates, or have been under different methods of cultivation, which would affect the keeping quality. When so many new varieties are being originated as is the case to-day, especially at the Experimental Stations, it is important to compare the keeping quality with those already on the market, hence the importance of having a representative collection of such growing at each station.

Blooming Season and Pollination.—While there is still much to be learned in regard to pollination, the records of the time of blooming and amount of bloom of each variety each year should prove of some importance. The blooming season of the different varieties in the orchards at the Experimental Farm, Ottawa, have been recorded since 1895. The

amount of bloom, whether small, medium, or large, of each tree, has also been recorded so that, at least, some idea of the relation of the amount of bloom to the size of the crop each year can be ascertained, and this, with the weather records, aids in ascertaining the cause of short crops.

Description of Varieties.—It is important to test a large number of varieties at one place in order that the technical descriptions, which are made of each sort, will be true for the district which the Station serves, and while there will be little variation in descriptions of fruit or vegetables grown in different places, climate certainly has some effect on colour, shape, flavour, keeping quality and, doubtless, other characters.

Vegetables and Annual Ornamental Plants.—The testing of vegetables and annual ornamental plants, although giving results sooner, is more difficult in some ways than with trees and bushes. So much depends upon the strain that if one buys seed of a certain variety from a certain firm one year and the next year, in continuing the test of varieties, seed of the same variety from another firm, the relative results obtained may be quite different. The strain tests of the Pennsylvania and other stations are well known. At the same time some varieties, on the average, have certain characteristics that others have not, which are shown in most of the strains, hence it is important to try new varieties as they are introduced, even though they may not be fixed in their habits—if they have desirable qualities they can be noted.

In connection with testing of varieties of vegetables and flowers at the Dominion Experimental Farms and Stations which are scattered over the country from the Atlantic to the Pacific, in order to make the comparison as fair as possible, seeds are obtained each year from the same firms for all the

Stations and the seed distributed from the Central Farm at Ottawa. As far as possible, the different varieties are obtained either from the firms which have introduced them or from the firms which make a specialty of them. While there are, as stated, difficulties in the way of a fair test with vegetables, five-year tests usually bring out the good or bad points of a variety.

Publication of Results.—In the annual report of the Experimental Farms the results of variety testing are published each year, and while it must be confessed that the results from single year tests are not always reliable and, in the case of vegetables, varieties which head the list one year, as regards yield, do not often do so the next. Such notes as the relative height of plants, time when ready for use, description and quality give useful information and are at least of some help to the man who will continue to test novelties and grow a number of varieties each year whether the Experimental Stations consider them of value or not.

VALUE OF VARIETY TESTS

Variety testing has been one of the main features of the horticultural work at the Dominion Experimental Farms for twenty-eight years, and it is believed that it has been well worth the time which has been devoted to it. While private individuals do a certain amount of testing themselves and some of the best growers are as quick to obtain a variety as an experimental station, yet the great mass of the people either does not know one variety from another or else knows only a few of the old sorts. As an example of the value of variety testing in the district about Ottawa, it may be stated that it was the practice until recent years, and may be to a small extent still, for an agent to offer for sale varieties of fruits too tender for the district. This was done because neither the people nor the

agent had a good way of finding out what varieties were suitable and many sorts had never been tried. As a result of the selling of trees of tender varieties, thousands of trees were winter killed in the past. Now the agent consults the lists of varieties recommended by the Experimental Farms and fruit growers can do the same if they so desire. The result is that a large proportion of the trees now sold will do well if cared for.

Lists of recommended varieties of fruits, vegetables, ornamental plants based on the experience gained at the Dominion Stations have been published in the annual reports and in bulletins and have been found very useful by young horticulturists, or by those extending their plantations. It is believed that thousands of dollars have been saved to fruit growers by either guarding them against buying unsuitable sorts or

by letting them know which were the best for their districts. The Dominion Government has a very large free mailing list and provides large editions of bulletins which are likely to prove useful.

For a number of years lists of best vegetables, based on results at the Experimental Farms, have been published in the annual reports. Lists have also been published of the best annual and perennial ornamental plants.

Nothing has been said about the work of originating new varieties, for which considerable effort has been put forth at Ottawa with some promising results. There is no variety which is perfect or suitable for every climatic condition, and it is believed that it will be more and more recognized in the future that certain varieties succeed best under certain conditions of soil and climate.

EXPERIMENTAL STATION, FREDERICTON, N.B.

THE COST OF GROWING POTATOES

WITH a view to getting actual figures on the cost of growing potatoes under average conditions in New Brunswick, a careful record has been made at the Dominion Experimental Station, Fredericton, for the past two seasons with an acre of land set apart for this particular purpose.

Neither rent of land nor depreciation of machinery was included in the calculation, for these two are items that are largely in the hands of the individual grower. As a general rule, however, it would be fair to charge as rent, 10 per cent of the value of the land, and special potato machinery will depreciate from 25 to 50 per cent per year if used steadily for ten days each season. In 1915, the depreciation of the potato digger alone, used at the Experimental Station, was \$6 per acre.

In 1915, the acre was planted with Green Mountain, Irish Cobbler and Empire State. Seed, cultural operations and harvesting cost in all \$67.93. Eighty barrels, of 165 pounds each, of marketable potatoes were obtained and sold at \$1.75 per barrel, making a profit over cost of production of 90c. per barrel. Seven barrels of culls were sold for \$3.50, so that the total profit for the acre amounted to \$75.50.

This land was rather wet naturally and during the very rainy weather of June and July was several times flooded, causing missed hills and inferior plants generally. This land was originally cleared many years ago and after cutting hay for thirty years it was allowed to grow up to spruce, birch and alder. It was again cleared in 1913 and grew buckwheat in 1914.

In 1916, an acre was planted with Green Mountain seed.

The total cost amounted to \$82.33, the increase over 1915 being due to high-priced seed, higher-priced fertilizer ingredients and very dear copper sulphate.

One hundred and twenty barrels of marketable potatoes were harvested and could have been sold at \$2.25 per barrel, market price when dug, making a profit per barrel over cost of production of \$1.56½, plus

six barrels of culls sold for \$3, making a total profit of \$190.20.

This land grew hay for many years and was broken up and grew potatoes with 750 pounds fertilizer in 1913, corn with 18 tons barnyard manure in 1914, oats without manure in 1915. This land is on a slope, fairly well drained and except for washing out slightly between the rows felt no bad effects from the June deluge.

THE ENTOMOLOGICAL BRANCH

THE INTRODUCTION INTO CANADA OF THE ICHNEUMON FLY, *MESOLEIUS TENTHREDINIS*, A PARASITIC ENEMY OF THE LARCH SAWFLY, *NEMATUS ERICHSONII*

BY C. GORDON HEWITT, D. SC., DOMINION ENTOMOLOGIST

THE destruction of the tamarack or larch throughout Eastern Canada by the larch sawfly, *Nematus erichsonii*, some years ago, is still fresh in the minds of many people. A detailed account of the larch sawfly, in which the extent of this destruction is given, was written and published as Entomological Bulletin No. 5* in 1912. The enormous havoc wrought by this insect was apparently due to the fact that there existed no natural means of control sufficiently powerful to control it before it had destroyed its food plant. Many of our native insects, such as the tent caterpillars, spruce budworm and others, are very destructive in some years but they are soon controlled by various natural factors and their numbers decrease to a non-destructive minimum.

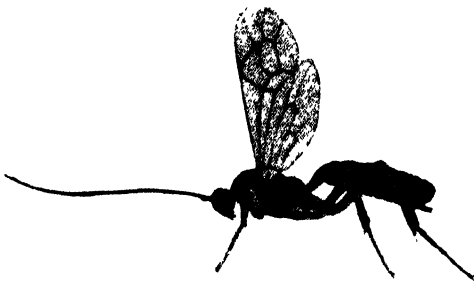
Some of the chief factors in the natural control of such insects are their insect parasites, but the larch

sawfly in Canada appears to be attacked by few native insect parasites. The most important of these is the small chalcid fly, *Cælopiethia nematocida* which was studied and described by me in the aforementioned bulletin.

In the course of my studies on the sawfly in England it was found that one of the most important enemies of the insect was an Ichneumon fly, *Mesoleius tenthredinis*. At first this parasite was referred to under the name of *Mesoleius aulicus*, but it was afterwards found to be a new species, and is described in Entomological Bulletin No. 5. This parasite was first reared by me in England in 1908 from cocoons collected during the previous year at Thirlmere in the English Lake district, where the larch sawfly, which occurs throughout northern Europe in which region it is native, was seriously defoliating extensive tracts of larches. In that year the parasites destroyed 5.8 per cent of the larvæ in the cocoon stage. It may be stated in passing that this sawfly passes the winter as a full grown larva in the cocoon which it spins beneath the surface of the soil

*"The Larch Sawfly, *Nematus erichsonii*, with an account of its parasites, other natural enemies and means of control", by C. Gordon Hewitt, Entomological Bulletin No. 5, Bulletin No. 10, second series, Experimental Farms, Department of Agriculture, Ottawa, 42 pp. 21 fig, 4 pls., 1912.

or under the grass, loose litter or moss. In the following year (1909) the percentage increased to 10.9 per cent. Owing to my departure from England in September, 1909, arrangements were made to continue this study by having cocoons collected and shipped to me at Ottawa in the following spring. This plan was carried out and in 1910 it was found that 64.7 per cent of the cocoons of the sawfly were parasited with *Mesoleius tenthredinis*. On account of this high degree of parasitism, together with the controlling effects of other factors, the sawfly was practically eradicated in that part of the



MESOLEIUS TENTHREDINIS
Enlarged $3\frac{1}{2}$ times, natural size

Lake district in which this parasite was so abundant, and the larches which had been completely defoliated during the previous two years were perfectly green again owing to the scarcity of the larvæ.

On account of the evident economic importance of this Ichneumon parasite, *Mesoleius tenthredinis*, as a natural factor in the control of the sawfly, and the comparative absence of natural controlling factors in Canada, upon which factors it is necessary to rely in the case of an insect against which artificial methods of control are out of the question, arrangements were made to import parasitized cocoons from the English Lake district into Canada with a view to establishing the parasite in different regions within the infested area. Cocoons were accordingly collected in the spring of 1911 in the locality where there had been such

a high percentage of parasitism in the previous year, and shipped in seven-pound biscuit tins in cold storage to Ottawa. The comparative scarcity of the pest made it unusually difficult to collect the cocoons in large quantities.

The parasitized cocoons imported during 1911 were distributed in the following localities: near Quebec city; Point Platon, Que.; Ste. Agathe des Monte, Que.; and Algonquin Park, Ont. A small lot of infested cocoons was sent to the State Entomologist of Michigan and a sixth lot was retained in Ottawa for the further study of the parasites. It was interesting to find that the practical disappearance of the sawfly from the infested region in England had resulted in a considerable falling off in the number of cocoons infested with the Ichneumon *Mesoleius tenthredinis* in 1910, for in 1911 it was found that the parasitism had decreased to 12.5 per cent in the cocoons that were received.

When in England in January, 1912, I visited the Lake District for the purpose of finding a locality where the parasites were abundant and as a result of an extensive examination of the parasitised larvæ in the cocoons in different localities, a suitable locality was found near Grasmere. Arrangements were made for the collection of cocoons in this locality and ten seven-pound biscuit tins of cocoons were imported in the spring and distributed in the Riding Mountains Forest Reserve in two tamarack swamps east of Cedar Lake in Manitoba by Mr. J. M. Swaine, Assistant Entomologist.

In the spring of 1913 a further importation of cocoons was made from England, this lot having been collected near Ambleside in the English Lake District. These cocoons were distributed by Mr. Norman Criddle, Field Officer of the Entomological Branch, in a tamarack swamp near Aweme in southern Manitoba where the larch sawfly was abundant. A sample of these

cocoons was kept at Ottawa and it was found that 68 per cent were parasitized, the different species of parasites occurring in the following proportions:

Mesoleius tenthredinis, 58.08 per cent.
Hypamblys albopictus Grav. 14.3 per cent.
Microcryptus labralis Grav. and Tachinids also emerged.

In the spring of 1916, Mr. Criddle collected cocoons in the tamarack swamp in which the parasitized cocoons had been distributed three years previously, and in June and July from 514 cocoons of the larch sawfly so collected, 27 specimens of *Mesoleius tenthredinis* were bred out, indicating that this sawfly parasite had been satisfactorily introduced and established in Canada. It is quite likely that such other European parasites as those mentioned above have also been introduced with the imported cocoons.

It is now realized that in the control of insect pests, especially those occurring over large areas, we must depend largely on what are known as biological methods of control. The best known example of such a method of control is that now being practised in the New England States and Eastern Canada. For a number of years, the Bureau of Entomology of the United States Department of Agriculture has been importing the insect enemies of the well-known introduced pests of the gipsy and brown-

tail moths from Europe and Asia and a large number of these insect enemies are now established and doing good work. Through the kindness of Dr. L. O. Howard, Chief of Bureau of Entomology, the Entomological Branch has been able to collect in the New England States and to import into the provinces of New Brunswick, Nova Scotia and Quebec a number of these insect parasites and predators, as it is realized that these are probably the chief factors that will eventually control the gipsy and brown-tail moths. This work has already been described in THE AGRICULTURAL GAZETTE.

It is naturally a mistake to imagine, as some people may, that these introduced parasites may possibly become pests. They feed solely upon insects and when the insect pest upon which they live is reduced in numbers or controlled the numbers of the parasites are *pari passu* reduced.

The introduction and establishment of the Ichneumon, *Mesoleius tenthredinis* in Canada adds another example to the growing list of cases in which an attempt is being made to control a pest by the importation of the natural enemies that control it in the country where it is native, and where its outbreaks are only sporadic and not so widely destructive on account of such natural enemies.

CORRECTIONS IN ENTOMOLOGICAL RECORDS

In an article on "Beneficial Insects", published on page 818 of THE AGRICULTURAL GAZETTE for October, 1914, Vol. 1, No. 10, Mr. Eastham records the occurrence of the army worm *Cirphus (Heliophila) unipuncta* in the vicinity of Grand Forks, B.C., where it is reported to have caused considerable damage, and in the same account the statement is made that these larvae were parasitised by

species of *Braconidae* and *Tachinidae*. An abstract of this article is given in "The Review of Applied Entomology", Vol. 3, Series A, (February, 1915), page 71, where the statement to which I have referred is repeated. The insect referred to was not the true army worm *Cirphus unipuncta* but another species, probably *Phytometra (Plusia) californica*, a caterpillar which was very abun-

dant in other parts of British Columbia, where it destroyed alfalfa and displayed to some extent the marching habit similar to the true army worm. In this manner the mistake entered entomological literature, with a result that it was repeated by quotation.

In his article on "Entomophagous Insects and their Practical Employment in Agriculture", published in *The International Review of Science and Practical Agriculture*, Vol. 7, March, 1916, Professor A. Berlese, Director of the Royal Entomological Station at Florence, Italy, states on page 330, that Braconidae and Tachinidae were introduced into British Columbia in 1914 at the expense of *Heliophila unipuncta* and of *Plusia californica*. This statement gives the impression first, that parasites have been introduced into British Columbia to check an outbreak of caterpillars and secondly that these caterpillars were the army worm *Cirphus*

unipuncta. The latter mistake has already been corrected; Professor Berlese was mislead in the latter part of his statement by the reference which I have already given. The mistake in regard to the introduction of the Braconidae and Tachinidae parasites into British Columbia was due, so I am informed by Professor Berlese, to the fact that the word "introdotti" (introduced), used in his article should have been 'scoperti' (discovered).

This opportunity is being taken to correct these mistakes and at the same time to point out how important it is that every care should be taken to verify reports regarding occurrences of insects with a view to being certain as to their identity. Otherwise inaccurate records may enter entomological literature and cause considerable difficulty and trouble to subsequent workers.

C. GORDON HEWITT.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE
WHO HAVE ENLISTED FOR OVERSEAS SERVICE

- R. M. Halpenny, Live Stock Branch, Ottawa.
- W. M. Addison, Entomological Branch, Fredericton, N.B.
- W. G. Bentham, V.S., Health of Animals Branch, Toronto.
- N. A. Ward, Experimental Farm, Ottawa.

THE SEED BRANCH

LAWN GRASS MIXTURES

BY JOHN R. DYMOND, B.A., SEED ANALYST

IN the spring of 1916 a number of samples of lawn grass seed were procured for analysis to determine what species of plants were represented in the mixture, the proportion in which each was present, the quality of the seed and the amount and nature of the impurities. Only one sample put up by the various firms whose seed was investigated was tested. The results reported below are intended merely to give

a general idea of the content of lawn grass mixtures commonly sold in carton boxes in the seed trade.

The results of the examination of the samples collected are given in the accompanying table. The letters represent the various firms whose mixtures were analyzed. The numbers indicate the number of seeds of different kinds found in $\frac{1}{2}$ gram of the mixture (1 oz.—28.35 gm.)

	A	B	C	D	E	F	G	H
Blue Grass.	2287	1373	791	263	1425	2262	1875	1526
Red Top	575				1004	807	90	1142
Timothy	42	503	178		12	26	298	32
White Clover.	76		2		23	57		3
Alsike	1	246	2		31	3		2
Fescues				219	34			75
Per. Rye Grass	14		79	137	22		52	33
Other Grasses		1		112*	75†	24		3
Other Clovers		2	1		1			
Weed Seeds	31	96	7	3	64†	11	58	17

*105 *Deschampsia flexuosa* L.

†59 Velvet grass (*Holcus lanatus* L.)

‡ Meadow fescue, 22; Sweet vernal, 4; Crested dogstail, 49.

It will be noticed that blue grass is the most prevalent sort in most of the mixtures, and that red top is also common. Some of the mixtures contained a considerable sprinkling of white clover. One (B) was made up almost entirely of blue grass, timothy and alsike and contained a very large number of weed seeds, principally chickweed, cinquefoil, sheep sorrel, small-seeded false flax, plantain and worm-seed mustard. There were also traces of docks, ox-eye daisy, Canada thistle, wild mustard, sedges, shepherd's purse and mayweed. The presence of such a large number of weed seeds (over 5000 per ounce) is an indication of the poor quality of the seed used

in making up the mixture. This is further shown by the fact that only 44 per cent of the timothy and 39 per cent of the alsike seeds were vital. The mixture was evidently composed of low grade seed and was altogether of very inferior value for the purpose for which it was put up.

While some of the samples examined were quite suitable as lawn grass mixtures, others were far from satisfactory. With the exception of mixtures put up by reputable seedsmen for stated conditions, the most satisfactory way of getting a mixture suited to the conditions under which it is to be grown is to buy the individual kinds of seeds and mix them in the desired proportions.

WEED SEED IN WESTERN GRAIN

THE following information in regard to the impurities in western grain was gathered by Mr. Wilson, one of the deputy inspectors of the Board of Grain Commissioners at Fort William.

A record was kept by Mr. Wilson of the weed seed impurities and point of shipment of 793 cars of grain arriving at the western elevator in the fall and winter of 1915. Nearly all of the grain covered by these records

was wheat; only a few cars of oats and barley are included.

The following table indicates the number of cars of grain from different electoral districts which contained the more common impurities. The weed seeds have been grouped under two heads. viz.: *Noxious*, i.e. those considered as noxious under the Seed Control Act, and *Other Sorts*.

	Brandon, Man.	Lisgar, Man.	Macdonald, Man.	Portage la Prairie, Man.	Provencher, Man.	Selkirk, Man.	Souris, Man.	Assiniboia, Sask.	Battleford, Sask.	Humboldt, Sask.	Moose Jaw, Sask.	Qu'Appelle, Sask.	Regina, Sask.	Saskatoon, Sask.	Medicine Hat, Alta.	Red Deer, Alta.
Total cars examined	2	24	71	7	50	1	13	27	13	60	151	3	112	176	2	3
Number of cars containing following weed seeds.---																
Noxious.																
Wild Oats	2	21	51	—	40	—	13	16	4	23	46	1	65	81	2	1
Ball Mustard	2	17	42	6	18	1	7	6	1	6	15	1	23	17	—	2
Cow Cockle	2	14	22	5	21	—	11	15	1	5	59	1	41	14	1	1
Wild Mustard	—	9	23	—	22	—	3	8	1	5	29	2	35	8	1	1
Hare's-ear Mustard	1	12	8	1	17	—	8	19	1	20	91	2	86	69	—	3
Stinkweed	2	16	38	5	27	—	6	7	4	8	63	1	55	14	1	—
Tumbling Mustard	1	2	5	—	5	—	2	11	2	18	61	—	31	47	1	2
Stickseed	1	3	13	—	4	—	8	16	5	7	35	1	34	61	—	1
Purple Cockle	—	7	19	1	15	—	1	5	1	—	3	—	5	—	—	1
Great Ragweed	—	—	19	—	18	—	—	—	—	—	3	—	1	—	—	—
Canada Thistle	—	1	10	—	1	—	—	—	—	—	—	—	1	—	—	—
Sow Thistle	—	—	2	—	2	—	—	—	—	—	2	—	—	—	—	—
Darnel	—	—	3	—	1	—	—	—	—	—	—	—	—	—	—	—
OTHER SORTS																
Wild Buckwheat	2	23	49	4	44	2	12	24	12	63	160	4	98	175	2	—
Lambs Quarters	1	22	55	7	37	1	13	27	13	58	144	3	100	176	2	3
Red-root Pigweed	1	6	17	1	11	1	2	15	1	18	47	2	30	51	—	1
Common Peppergrass	1	5	7	—	2	—	2	5	—	7	13	—	16	24	—	—
Russian Pigweed	—	—	1	—	5	—	2	—	5	6	7	—	11	30	1	—
Am. Dragonhead	—	10	6	—	8	—	2	1	—	—	3	—	1	2	—	—

It will be noticed that some kinds of weed seeds, notably wild oats, lamb's quarters and wild buckwheat, seem to be of general distribution, while others are more prevalent in some localities than others. For example, ball mustard occurred in forty-two cars out of seventy-one from Macdonald, Man., while hare's-ear mustard was found in only eight. In contrast to this only fifteen cars out of 151 from Moose Jaw, Sask.,

contained ball mustard while hare's-ear mustard occurred in ninety-one. Great ragweed, Canada thistle, sow thistle and darnel appear to be of only local distribution as yet.

As the distribution of weeds is determined by a number of factors, —accidental introduction, soil and climatic conditions, rotation and system of cropping, etc., —no effort is made to interpret the data here presented.

THE LIVE STOCK BRANCH

THE LATE JOHN BRIGHT

MR. JOHN BRIGHT, Live Stock Commissioner for Canada, died at his home at Ottawa on April 22nd. Mr. Bright was born in the constituency of South Ontario in August, 1864. He farmed on an extensive scale at Myrtle, making a specialty of Clydesdale horses, Shorthorn cattle, and Shropshire sheep. He took a great interest in live stock organization work and was one of the best known men in Canada amongst the live stock breeders and was highly esteemed from coast to coast. For many years he was a Director of the Clydesdale Horse Association of Canada, of which he became President. He took a keen interest in Winter Fairs, more especially those of Guelph and Ottawa, and at the time of his death was the President for a second term of the Central Canada Exhibition Association. He was intimately associated with many of the most important activities connected with the development of the live stock industry in Canada, in the progress of which he was always deeply interested and to which he was able in very many directions to give valuable and effective service.

Mr. Bright also played a prominent part in the organization of the National Live Stock Records and was continuously a member of the National Records Board until he became Live Stock Commissioner



THE LATE MR. JOHN BRIGHT

in 1912. To the position of Live Stock Commissioner he brought wide experience in practical live stock work, and his many years of intimate association with the industry were of great value to the Department in developing the newly-created Branch along sound and right lines and by his death the Department has lost a zealous and valuable officer.

He has left a widow, one daughter and a son, Gunner Roy Bright, who enlisted with the first contingent and is still at the front.

DEVELOPMENT OF THE SWINE RAISING INDUSTRY

THE Hon. Martin Burrell, Minister of Agriculture, has undertaken, through the Live Stock Branch, to improve the swine raising industry of Canada. To organize this work and set it going the services of Mr. G. E. Day, B.S.A., Professor of Animal Husbandry of the Ontario Agricultural College, have been secured, for which purpose the Ontario Department of Agriculture has granted Professor Day leave of absence for a limited period.

The work will be undertaken in conjunction with the Canadian Swine Breeders' Association. This organization, at their annual meeting held in February, appointed a committee consisting of the president, Mr. P. J. McEwen, of Kirch. Mr. J. E. Brethour, Burford, and Mr. R. W. Wade, secretary of the association, to look into the possibilities of placing the bacon industry on a more permanent basis.

A meeting of the committee, with Mr. H. S. Arkell, Assistant Live Stock Commissioner, Professor Day,

and other officials, was held in Toronto on April 17th, where it was brought out that the present was a most favourable time for a special effort to retain the hold that Canadian bacon has secured in Great Britain during the past two years. During this period a large proportion of the Danish bacon that previously went to England has been marketed in Germany. This has allowed Canadian bacon to secure the recognition it had in the early '90's, when upwards of 100,000,000 lb. were annually exported to the British market.

The work to be carried on will first of all, seek to establish the confidence of the Canadian farmer in the stability of the trade. To bring this about the public will be supplied with reliable and complete information in regard to the condition of the market for bacon and for hogs both at home and abroad. An effort will also be made to improve the methods of marketing. Professor Day will enter upon his duties immediately.

THE HEALTH OF ANIMALS BRANCH

INFRACTIONS OF THE QUARANTINE REGULATIONS

A resident of the Cyrville district was brought before the County Court Magistrate on December 26th, 1916, and charged with feeding garbage to hogs without the necessary license. He pleaded "guilty", and was leniently dealt with. A fine of \$5 was imposed, together with the costs, which made a total fine of \$8.62.

A hog feeder residing at Quarries, Ont., was arraigned before Magis-

trate Smith on March 6th, 1917, charged with collecting and feeding garbage to swine without first obtaining a license as required by section 88 $\frac{1}{4}$ of the quarantine regulations. The accused pleaded "not guilty", but the evidence proved that he had obtained garbage elsewhere than on his own premises, and fed it to his hogs. The Magistrate, therefore, gave a verdict of "guilty", and imposed a fine of \$20, with costs, making a total fine of \$25.63.

PART II

Provincial Departments of Agriculture

SHORT COURSES IN AGRICULTURE AND HOME ECONOMICS

"Help given in an educational direction will not only mean better farming, but better farmers and better and happier men and women." Factors in Canadian agriculture working towards the bringing about of such conditions are the short courses in agriculture and home economics. The past year has witnessed great educational activity, as evidenced in the series of articles which herewith follow. A review of the symposium reveals the fact that approximately 500 short courses were held throughout Canada, having an aggregate attendance of 176,000 people. In the table of federal appropriations under THE AGRICULTURAL INSTRUCTION ACT for 1916-17 recorded in the September number of THE AGRICULTURAL GAZETTE for 1916, upwards of \$160,000 is set apart for "Instruction and Demonstration" and "Women's Work," a considerable proportion of which was used in helping to bring agricultural knowledge and instruction to the great multitude of people resident in rural districts.

PRINCE EDWARD ISLAND

SHORT COURSES IN AGRICULTURE

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

DURING the past winter season a series of short courses, similar to that of last year, was conducted in different parts of the province. In all cases the courses were of one week's duration and were conducted at points not previously visited. The outlying districts were subject to first consideration on account of not receiving the greatest benefit when the short courses were conducted in the larger centres. In all, 81 meetings were held at 9 courses. The average attendance was 66.

The speakers and their subjects were as follows:

W. R. Reek, B.S.A., Swine, (illustrated).
W. J. Reid, B.S.A., Horses, Sheep, Dairy Cattle, (illustrated.)
W. R. Shaw, B.S.A., Sheep, Beef Cattle, (illustrated).

Andrew McRae, Dairy Cattle, (illustrated).

Jas. Thompson, Wool, (demonstration).

CROPS AND FERTILIZERS

J. A. Clark, B.S.A., Cereals, (demonstration), Tillage, Rotations.

J. L. Tennant, B.S.A., Clovers, Grasses, Weeds, Soils.

W. J. Reid, B.S.A., Manures.

P. A. Murphy, Plant Diseases, (demonstration) Potatoes.

M. H. Coughlan, B.S.A., Weeds, (demonstration), Soil Fertility.

DAIRYING

Fraser T. Morrow, Care of Milk, Milk Testing, (demonstration).

Chas. Cook, Record Centres.

POULTRY

W. Kerr, B.S.A., Egg Circles, Co-operation.

SPECIAL SUBJECTS

W. R. Reek, B.S.A., Underdrainage, Open Drains.

Manning Ells, Fort Williams, N.S., Strawberries.

The meetings were not as well attended as usual. A scarcity of labour due to the war prevented many farmers from attending regularly. In several instances storms and bad roads were of serious consequence for one or more days.

In all cases the lectures were arranged according to the demands and apparent needs of the locality. The interest following was all that could be expected. Lectures on live stock were always in order. These included the care and development of young stock, feeding, management and general items of interest to the breeders present. In the evening, lantern slides were used to supplement the remarks and in several instances judging classes were conducted on one afternoon during the week.

The subjects of crops and dairying were applied generally. Poultry was discussed in a few instances. On account of the general operations of the egg circles, operated by the Dominion Department of Agriculture, a general programme was not found necessary. Underdrainage is a comparatively new subject in this province and was discussed as the opportunity demanded. In the future it will undoubtedly gain in prominence through general application. The cultivation of small fruits is becoming more prominent and a specialist on strawberries was employed to address an organization of growers in one district.

Aside from a definite programme of lectures, the co-operative ventures of each locality were encouraged and strengthened in every possible way. On two occasions a community breed-

ers' club was formed for the purpose of combining the efforts of the live stock men toward definite improvement and greater personal profit. In one community a farmers' institute was organized and in another a farmers' association.

The majority of the benefits that follow the courses are not in evidence while the instruction is being given, but become apparent some time after. Increased production has been greatly enhanced as a result. Improved varieties of grain have been introduced which have given rise to seed centres and the more general sowing of registered seed. The treatment of seed grain for smut and other diseases had been generally adopted. The spraying of potatoes for blights has been taken in hand by several sections where co-operative sprayers will be operated this season. In all sections visited, the necessity for a more organized effort became apparent to those attending. As a result, many questions are being discussed co-operatively that were formerly held as only being of individual interest.

The sections visited accepted the responsibility of supplying a hall, heated and lighted. A certain amount of hauling was done and general assistance rendered free of charge. Other necessary expense was borne by THE AGRICULTURAL INSTRUCTION ACT grant.

The most assuring feature for the success of the courses was the unlimited co-operation of the members of the Dominion and Provincial Departments of Agriculture throughout the series.

SHORT COURSES IN HOUSEHOLD SCIENCE

BY MISS HAZEL STERNS, SUPERVISOR WOMEN'S INSTITUTES

DURING January, February and March six short courses in household science were conducted by the Women's Institute Branch of the Department of Agriculture.

Each course lasted for two weeks and the total attendance was 127.

The classes were held in Prince of Wales College, which has a completely equipped household science department, and every facility was at hand to enable the pupils to efficiently carry on the practical work of the course.

In the lessons in cooking, the food materials with the nutritive value of each were discussed and the proper methods of cooking were fully demonstrated in class work. Economy was one of the principal features brought out. It was shown that money expended for the raw material could be considerably lessened when one had a thorough knowledge of the proper methods of cooking.

In addition to the practical work, lectures on foods and the planning of balanced menus were given.

In the home nursing classes, practice in bed making, bandaging and changing the clothes with the patient in the bed was given; while lectures were given on the care of the patient, treatment in simple diseases, emergencies and disinfectants.

Table setting and serving was taken up in practical work.

Two lessons of three hours each were given in laundry work, and included the washing of silks, woollens and cottons, dry cleaning, removal of stains, tinting, the making of laundry and castile soaps.

The millinery course embraced principally the covering and trimming of buckram shapes, and each member of the class had the opportunity of doing this work for herself.

The making of violets, roses and daisies from ribbon was an interesting feature with the millinery course.

The subject of house furnishings was dealt with under the following heads: harmony of decoration and furnishing, principles of art and design applied to furniture, papers, hangings and pictures, planning of colour schemes and the furnishings for the various rooms. Stencil patterns were made by the class and many attractive designs were stencilled.

Lectures were given on the planning of a farm kitchen and the convenient arrangement of the equipment in it.

In the lectures on home management, the following topics were discussed: The value of system in house-keeping, the testing of textiles, the importance of the home maker having a thorough knowledge of business in regard to banking, investments, etc., the keeping of household and personal accounts.

Lectures on hygiene and sanitation were given and embraced the relation of bacteria to disease, the various ways in which bacteria enter the body and the conditions under which they flourish. The value of proper food, fresh air and sunlight in keeping up the resisting power of the body was clearly shown.

Lectures were given on improvement of the home grounds by J. A. Clarke, B.S.A.; on poultry (illustrated) by Wm. Kerr, B.S.A.; on vegetable gardening by J. L. Tennant, B.S.A., and on improvement of the schools by J. E. McLarty, B.S.A.

In connection with the cooking, laundry, home nursing, and home management classes printed bulletins containing all the notes used were distributed to the pupils.

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

DURING the past winter we conducted one central short course of two weeks duration at the College of Agriculture, Truro, and three county short courses each of three days' duration, at Lawrencetown in Annapolis county, Bridgewater, Lunenburg county, and Musquodoboit in Halifax county. More of these short courses would have been held had it not been for the depletion in our staff due to enlistment of a number of its members in the overseas forces. As a partial substitute for these short courses one day "rallies" were held at a number of places at which subjects of special importance in connection with the production of food in the coming season were specially dealt with.

No substantial new innovations were introduced in our short courses this year, except that at every short course a special session was set aside to consider the needs of the Empire, and to urge the opportunity and duty of the farmer in respect to that part of Empire service relating to food production.

At the two weeks short course held at the college the average attendance was 250 men, but there were actually in attendance considerably over 400.

At the same time there was a short course for women which recorded an average attendance of 40. At the three days short courses held at the three centres mentioned above, the average attendance at each session morning, afternoon and evening, was 78. This does not include the extra attendance on rally day at Lawrence when there were about 400 people present, but as these did not come to attend the regular classes, but simply on account of the special advertisement given for rally day, and also in the main to view the moving pictures on agricultural scenes which were made a special feature, I have not included these men in making up the figures.

The co-called rally days have been conducted partially under the auspices of our institution and partly under the management of the Canadian Pacific Railway and the Dominion Experimental Station at Kentville. At these rally days one or more speakers from the college have been present, and have aimed to present such important features as the value of increased crop production, conservation of live stock, etc., etc. Up to date such rallies have been held with an average attendance at each of approximately 300.

DAIRY COURSE FOR THE MARITIME PROVINCES

THE first short course in dairying under the auspices of the three Maritime Provinces was held at the College of Agriculture, Truro, N.S., from Mar. 7th to Mar. 31st. The first two weeks were devoted to creamery work and the second two weeks were devoted to cheese-factory work. The course was open only to cheese and butter makers having at least one year's experience.

The college dairy was specially fitted up for the course with the latest in creamery and cheese factory machinery, including two makes of pasteurizing vats, combined churns, printing machines, starter cans, moisture, salt and acid tests; for cheese making, agitating vats, new type curd mills, etc.

The attendance was much larger than was anticipated, the total enrolment being forty-one. The col-

lege staff took an active interest in the work and gave instruction in special subjects such as milk production, chemistry, bacteriology and veterinary science. Special instructors were secured as follows:

Cheese-making, Mr. George H. Barr, Chief of the Dairy Division, Ottawa;

Butter making, Mr. Mack Robertson, Belleville, Ont., and Mr. F. T. Morrow, Creamery and Cheese Factory Inspector of Prince Edward Island; Milk Testing, Mr. C. W. McDougall, Supt. of Dairying, Sussex, N.B.; Cream Separators, Mr. Ben Gallant, St. Louis, P.E.I. The course was in charge of Mr. W. A. MacKay, Provincial Dairy Superintendent.

QUEBEC

BY F. N. SAVOIE, B.S.A., SECRETARY FOR AGRICULTURE

AGRICULTURAL teaching has made considerable progress in our province since better farming trains were inaugurated in 1912. In 1915, arrangements were made to hold agricultural weeks or agricultural short courses. These courses were so popular, and so much interest was shown by all classes of the population, that it became necessary to enlarge the scope of our instruction campaign. In the fall of 1915, the Minister decided to divide the short courses into two sections, owing to the large number of requests for the same. Arrangements for one of these sections was

made by the Department of Agriculture, the other one was organized by the professors of the school of agriculture of Ste-Anne de la Pocatière, under the control of the Department of Agriculture.

Lectures and demonstrations on domestic science were given in addition to the regular programme in agriculture, and they were very successful. Last fall, the arrangements were the same but the number of subjects and demonstrations were increased, according to the needs of the district. The work done by the lecturers in the various centres is shown in the following tables:

EASTERN QUEBEC SECTION

PLACES VISITED	Counties	Week of	GENERAL AGRICULTURE			DOMESTIC SCIENCE		
			Lectures	Demonstrations	Attendance	Lectures	Demonstrations	Attendance
St. Gervais.	Bellechasse	Nov. 6	30	3	881	0	0	0
St. Valier.	Bellechasse	Nov. 13	29	2	1,925	0	0	0
Causapsca.	Matane	Jan. 8	28	3	1,749	6	4	400
Val Brillant.	Matane	Jan. 15	30	3	2,366	6	4	945
St. Joseph de Lepage.	Matane	Jan. 22	29	3	3,590	6	4	800
St. Fabien.	Rimouski	Jan. 29	30	3	5,200	6	4	1,000
St. Eloi.	Témiscouata	Feb. 12	29	3	903	6	4	340
Ste-Helene.	Kamouraska	Feb. 19	30	3	2,590	6	4	850
Totals.			235	23	19,204	36	24	4,335

Average length of each lecture: one hour.

Average length of each demonstration: one hour and a half.

WESTERN QUEBEC SECTION

PLACES VISITED	Counties	Week of	AGRICULTURE			DOMESTIC SCIENCE		
			Lectures	Demonstrations	Attendance	Lectures	Demonstrations	Attendance
St. Jean	St. Jean	Nov. 27	40	3	1,300	2	4	380
Farnham	Missisquoi	Nov. 4	46	3	1,800	2	3	350
Magog	Stanstead	Nov. 11	43	2	1,800	2	3	420
Drummondville	Drummond	Nov. 18	43	4	1,600	2	3	360
Deschaillons	Lotbinière	Jan. 8	30	3	3,000	1	1	615
Bécancour	Nicolet	Jan. 15	36	3	2,000	1	1	450
Baieville	Yamaska	Jan. 22	46	4	4,000	1	2	800
Sorel	Richelieu	Jan. 29	43	2	400	1	1	340
Verchères	Verchères	Feb. 5	43	5	4,500	1	1	850
Chambly Canton	Chambly	Feb. 12	32	3	1,800	1	1	530
Marieville	Rouville	Feb. 19	30	3	1,850	1	1	520
Laprairie	Laprairie	Feb. 26	35	3	2,900			
Ste. Martine	Chateauguay	Mar. 5	28	3	3,300	1	1	600
Huntingdon	Huntingdon	Mar. 12	4	0	20	0	0	
St. Hyacinthe	St. Hyacinthe	Mar. 19	28	4	1,600	1	1	475
Acton Vale	Bagot	Mar. 26	31	1	1,600	2	1	500
Totals.			558	46	33,470	19	24	7,190

Average length of each lecture: one hour.

Average length of each demonstration: one hour and a half.

The figures given for the attendance at each place visited, in both sections of short courses, include the total number of persons registered at each session during the week.

In the eastern section, it was not possible to hold more than two sessions per day, owing to the great distances the farmers of the neighbouring parishes had to cover. In the West, communications were easier and it was possible to hold three sessions.

Here, as in the East, demonstrations were given with material prepared for the purpose. During the evening slides were shown illustrating the lessons.

NEW METHODS ADOPTED

Owing to the great interest shown in Domestic Science by all the classes of the population, it was decided this year by the Minister of Agricul-

ture to enlarge parts of the programme concerning that study. A special room was reserved for these lectures at each place, and a series of lectures and demonstrations on all subjects pertaining to Domestic Science was given.

Another subject of very great importance was added to the programme: the general hygiene of the family. The services of a district hygienist were secured for each place visited, with the co-operation of the Superior Council of Hygiene of the province of Quebec. Arrangements were also made, this year, to give complete demonstrations in poultry keeping, horticulture, live stock judging and the diseases to which live stock are exposed. This last subject was treated by a competent veterinary.

Additional lectures were also given in some parishes not included in the regular series. Owing to the ex-

tremely cold winter and the bad condition of the roads, a great many farmers were unable to attend the lectures, and it was deemed advis-

able to go and meet them in their parishes, every time it was possible to do so. The list of these parishes is given in the following table:

ADDITIONAL LECTURES

PLACES VISITED	Counties	Date	AGRICULTURE		
			Lectures	Demonstrations	Attendance
St. Germain	Drummond	Nov. 20	3	2	450
South Durham	Drummond	Nov. 21	2	1	375
St. Alexandre	Iberville	Jan. 3	2	0	90
St. Félix	Drummond	Jan. 4	4	1	160
Nicolet	Nicolet	Jan. 27	7	1	370
St. Antoine	Verchères	Feb. 7	2	0	300
Henryville	Iberville	Feb. 23	3	0	200
St. Constant	Laprairie	Feb. 27	12	2	550
Henryville	Iberville	Mar. 7	4	0	390
St. Philippe	Laprairie	Mar. 7	1	0	250
St. Sébastien	Iberville	Mar. 8	5	0	300
Laprairie	Laprairie	Mar. 10	1	0	60
Ste. Barbe	Huntingdon	Mar. 13	2	0	75
St. Stanislas	Beauharnois	Mar. 14	11	1	220
St. Martin	Laval	Mar. 22	1		290
Fortierville	Lotbinière	Mar. 28	4	1	300
Upton	Bagot	Mar. 28	1	0	250
Notre Dame du Bon Conseil	Drummond	Apr. 3	4	1	400
Totals			69	10	5,030

Total number of persons present, lectures and demonstrations given in the two sections:

	Lectures	Demonstrations	Attendance
Agriculture	862	69	57,704
Domestic Science	55	48	11,525
	917	117	69,219

RESULTS OBTAINED

All our expectations have been fulfilled by the success of these various agricultural weeks. Not only were the lectures closely followed but the interest of those in attendance

never lagged. Lecturers were kept busy answering practical and intelligent questions and such was the demand for our agricultural pamphlets that several editions of the same were exhausted.

MACDONALD COLLEGE

FROM INFORMATION SUPPLIED BY DR. F. C. HARRISON, PRINCIPAL

THE short courses held at Macdonald College this year were two in number, in addition to the short course given in Montreal on suburban gardening. A four days' course in animal and cereal husban-

dry was held Feb. 13th to 16th, the attendance at which was between 60 and 70. The instruction was given by members of the Macdonald College staff, assisted by Mr. J. H. Grisdale, B. Agr., Director of Dom-

inion Experimental Farms, Ottawa. The course included the study of clovers and clover seed growing, soil management, grasses and forage crops, root crops, small grains, orcharding, corn judging and ensilage growing, in addition to the breeding, care and judging of all classes of live stock.

A short course in poultry was held from Feb. 19th to March 2nd and was attended by eleven students. This course covered every branch of poultry-keeping and included lectures on crop production and soil management as related to poultry raising, farm management, the growing of small fruit, care of the orchard, and demonstrations on trussing birds for the table, roasting and serving

of poultry and the value of eggs in the diet. The staff of Macdonald College was assisted in this course by Mr. George Robertson, Poultry Department, Central Experimental Farm, Ottawa; R. B. Austin, of Point Fortune, Que., and J. G. Morgan, Provincial Poultry Instructor, Quebec.

At the conclusion of the short courses, four gentlemen prominent in agriculture were given honorary diplomas by Macdonald College. These were: Dr. Duncan McEachran, who owns and operates a large farm at Ormstown, Que., Dr. J. C. Chapais of Kamouraska, Que., Mr. Robert Ness of Howick, Que., and Mr. Robert Brodie of Notre Dame de Grace, Quebec.

ONTARIO

THE ONTARIO AGRICULTURAL COLLEGE

BY S. H. GANDIER, B.S.A., SECRETARY

THE free short courses at the Ontario Agricultural College this year were not attended in such large numbers as usual, war conditions, no doubt, being largely responsible. Naturally a heavy attendance was not expected; but it was surprisingly good, quite beyond expectations when present country conditions are taken into consideration. Most of the courses were conducted in much the same way as in former years. Two courses, apiculture and horticulture, were lengthened and more comprehensive instruction given in them. Two new courses were added, a course in underdrainage and one in business and marketing, and the interest shown in these was very gratifying and encouraged their continuance next winter. Following is a brief outline of the instruction given in each course and the numbers in attendance.

Stock and Seed Judging.—Jan. 9th to 20th—attendance, 191.

This is a two weeks' course intended particularly for farmers and farmers' sons who have no oppor-

tunity to take advantage of college instruction except for a short time in the winter. Each day from 8.30 to 10.00 a.m. instruction in seed work was given—purity and germination, cleaning, selecting, grading, judging, identification of weed seeds, etc. The remainder of the morning and every afternoon was devoted to stock judging in the fifty-foot ring in the judging pavilion. Lectures on breeds of horses, cattle, sheep and swine were followed by practical judging by the class. Some cattle, sheep and hogs which were in the ring were afterwards slaughtered for practical demonstration purposes.

The Ontario Department of Agriculture offered this course as a prize to the winners of the acre profit, baby beef, hog raising and dairy profit county competitions, paying all railway and boarding expenses incurred. Ninety-six winners took advantage of this opportunity.

Poultry Raising.—Jan. 9th to Feb. 3rd—attendance, 24.

The usual attendance in this four weeks' course is about 35, equipment

for practical work limiting the class to this number. The smaller class this winter gave opportunity for greater individual attention, consequently the course was most thorough and highly satisfactory to the students. The course included instruction in location of poultry farms; plans and estimates of poultry houses; breeds; principles of breeding; judging; hatching and rearing; killing and dressing; operating incubators; grading eggs; diseases; marketing, etc.

Beekeeping.—Jan. 9th to 27th—attendance, 34.

to give opportunity for practical demonstrations in the apiary. This year the summer course will be held from June 11th to 15th.

Horticulture.—Jan. 9th to Feb. 16th—attendance, 16.

Formerly this was a two weeks' course in fruit growing, followed by one week in apple packing. It was expected that more interest would be shown in a course embracing general horticulture and a six weeks' course was planned giving instruction in fruit and vegetable growing, floriculture and landscape gardening.



A SHORT COURSE CLASS IN STOCK JUDGING AT THE ONTARIO AGRICULTURAL COLLEGE

Previously this was a two weeks' course but it was found impossible to give full instruction in this time and a week was added this year. It is impossible to give a great deal of practical instruction at this season of the year, hence almost the entire time was necessarily devoted to the lecture method of instruction. Points receiving attention were methods of management throughout the season, diseases and their control, markets, queen rearing and requeening, etc. A summer course has been instituted to supplement the winter course and

The attendance was quite disappointing and the experiment proved almost a failure. It is improbable that it will be continued in this way another year. Special courses in fruit growing and vegetable growing may be planned.

Drainage.—Jan. 9th to 20th—attendance, 18.

The importance of drainage in many sections of Ontario, particularly in the south-western counties, has long been recognized and much has been done by the Ontario Department of Agriculture to assist in

reclaiming and improving low-lying lands. The possibilities for a short course in drainage by the physics department of the college were considered of sufficient importance to make the experiment, and the first session was held last January. The interest shown in this course was very gratifying and warrants its repetition next winter. Eighteen students, mostly from the south-western counties, attended, and a larger number could not have been accommodated. The course included instruction in the

ings in order that students of all short courses might take advantage of this opportunity. Men who are recognized experts in the various economic questions which affect the farmer were secured for these evening lectures and the course proved to be intensely interesting and most profitable for the large numbers in attendance. Over three hundred attended every lecture. The discussion on some topics after the close of the lecture was most spirited, the meetings running an hour or more over-



A SHORT COURSE CLASS IN BEEKEEPING

care, construction, and use of home-made and standard types of levels used in surveying, map making, principles of drainage, types of soils, depths and grades of drains, laying of tile, silt basins, ditching by hand and by machinery, etc.

Business and Marketing.—Jan 9th to 20th.

This is a new course to meet the demand for instruction in simple forms of farm book-keeping, marketing, and other matters pertaining to the business management of farming. Lectures were held only in the even-

time. Following are some of the main questions discussed:—Farm book-keeping; banking; live stock markets, stock yards and abattoirs; co-operative societies; the middleman, etc.

COURSES IN DAIRYING

Three Months' Course for Cheese and Butter Makers.—Jan. 2nd to Mar. 24th—attendance, 28.

For a good many years this course has been held at the college without any particular changes. Its object

is to give instruction in butter and cheese making on the farm and to prepare young men for positions as creamery and cheese factory managers. No diploma is granted until students have successfully completed one year as manager after taking the course. Practical work includes factory and farm dairy work in cheese and butter making, milk and cream testing, running engine and boiler, pipe fitting, soldering, making cheese boxes and other necessary work in the dairy industry. Lectures are given on the following subjects:—dairy husbandry, field husbandry, veterinary science, chemistry, bacteriology, cold storage and book-keeping.

Cow Testing.—Mar. 26th to 31st—attendance, 27.

For a number of years the college

has held a course of one week in cow testing, impressing upon dairy farmers the necessity of keeping proper records of the production of each cow in the herd in order that only the highest producers might be retained. There are hundreds of cows in Ontario which do not pay for their board, and this course is likely to be continued indefinitely.

Ice Cream and Soft Cheese Making.—Mar. 26th to 31st—attendance, 13.

There is a certain demand from creameries and restaurants for instruction in the best methods of ice cream and soft cheese manufacture. Ice cream instruction was first given in 1914 and has been continued each year since that date with the usual attendance.

FOUR TO SIX WEEKS' COURSES IN AGRICULTURE

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER

WITH each year comes an added interest and a keener appreciation of the four to six weeks' courses in agriculture conducted by the District Representatives throughout the province. During the months of January and February of this year, 37 courses were held in as many counties, with a total attendance of 839 farmers' sons, which is an average of 24 to each class.

These classes are usually held in small towns or villages in preference to large towns or cities; in fact many of our most successful courses have been held in very small communities. The policy has been to hold each course in a different place in the county each year, in order that all parts of the county may be reached. The final selection of the place is left with the District Representative who is guided in his choice by the demands from the various sections of his county. Generally speaking the community agrees to supply a

suitable hall with heat and light free of charge. In addition to this, liberal grants may be received from town, county, or township councils, as well as from private individuals. The money thus received is devoted largely to prizes for public speaking, essays, stock judging, and general proficiency.

Once the place where the course is to be held is finally decided upon, the District Representative uses every means available to have the farmers' sons of that section become familiar with the course and its advantages. The first and most important step is to acquire a list of all the young men within a radius of from five to ten miles between sixteen and twenty-five years of age. This is easily secured through the rural school teachers. A circular letter is then mailed to all the prospective students thus secured, inviting them to attend a meeting at which the District Representative outlines the work to be undertaken:—if possible

it is desirable to have present a student of one of the former courses to give his views as to the value of a course of this kind. At this meeting a committee is appointed whose duty it is to secure recruits for the course. If this plan is followed carefully there is usually very little difficulty in securing a good attendance if the young men are in the district. A little later, usually about six or eight weeks before the course begins, the District Representative issues a

work. With this pamphlet, an application form is sent to be used by those intending to take the course. These are sometimes printed on post-cards. The following is a sample of those generally used:—

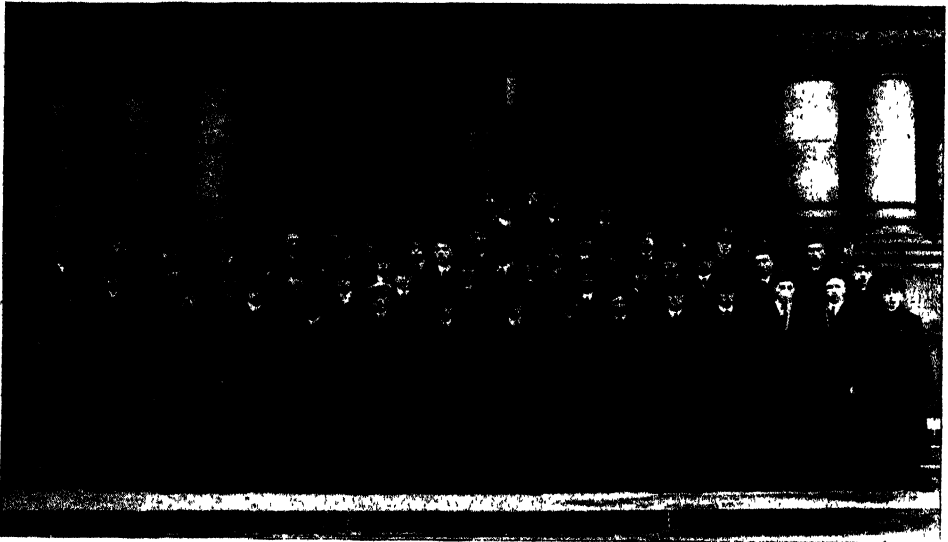
APPLICATION FOR ADMISSION

J. LAUGHLAND,

Dept. of Agriculture, Date.....
Collingwood,

Dear Sir,—

I hereby apply for admission to the



AGRICULTURAL CLASS VISITING THE MINISTER OF AGRICULTURE AND OFFICERS OF THE DEPARTMENT OF AGRICULTURE AND UNION STOCK YARDS, TORONTO, ONT.

pamphlet announcing the place and date of the course and giving a brief outline of the subjects to be taken up, which include live stock, feeds and feeding, dairying, poultry, veterinary science, soils, underdrainage, manures and commercial fertilizers, field crops, cement construction, fruits and vegetables, weeds and insects, fungous plants, poultry marketing and co-operation, farm book-keeping and arithmetic, and literary

COURSE IN AGRICULTURE to be conducted at Creemore from January 9th to February 2nd, 1917.

Name Age

Post Office

Lot Township

The following time table used at a course last year will serve to illustrate the nature and extent of the work undertaken at these courses:—

COURSE IN AGRICULTURE, CREEMORE, JANUARY 9TH TO FEBRUARY 2ND, 1917

	9 to 9.45	9.45 to 10.30	10.40 to 11.20	11.20 to 12	1.30 to 2.45	2.45 to 4.00
Jan. 9, T	Introduction	Live Stock	Field Crops	Soils	Judging Oats	Weeds
" 10, W	Dairying	Poultry	Live Stock	Feeds and Feeding	Testing Milk	Grading Clover
" 11, T	Field Crops	Fruit Growing	Cement Construction	Insects	Stock Judging	Stock Judging
" 12, F	Feeds and Feeding	Book-keeping	Manures	Fruit Growing	Weed Seeds	Literary Work
" 15, M	Beautifying Farm Surroundings	Field Crops	Poultry	Judging Oats	W. A. WEIR, Bees	
" 16, T	Cement Construction	Soils	Storing Ice	Fungous Pests	Judging Wheat	Weeds
" 17, W	Field Crops	Bacteriology	Fertilizers	Live Stock	Identifying Insects	Pedigrees
" 18, T	Underdrainage	Feeds and Feeding	Dairying	Book-keeping	Stock Judging	Stock Judging
" 19, F	Poultry	Live Stock	Literary Work	Soils	W. H. WEBSTER Markets and Co-operation JOHN GARDHOUSE Sheep	
" 22, M	Weeds	Feeds and Feeding	Fruit Growing	Field Crops	A. MACLAREN Community Leadership	
" 23, T	Fertilizers	What a Farmer should read	Poultry	Feeds and Feeding	Spray Mixtures	Judging Bar-ley
" 24, W	Insects	Field Crops	Sewage Disposal	Book-keeping	Stock Judging	Stock Judging
" 25, T	Farmers' Organizations	Fruit Growing	Feeds and Feeding	Manures	DR. H. G. REED, Horses and Vet. Science	
" 26, F	Weeds	Field Crops	Literary Work	Good Roads	Testing Milk	Packing Apples
" 29, M	Live Stock	Farm Labour	Soils	Poultry	Stock Judging	Stock Judging
" 30, T	The Care of Machinery	Underdrainage	Feeds and Feeding	Bacteriology	A. LEITCH Farm Management	
" 31, W	Soils	Reforestry	Live Stock	Fruit Growing	Stock Judging	Stock Judging
Feb. 2, T	Manures	Fungous Pests	Feeds and Feeding	Live Stock	Organizing Junior Farmers' Improvement Association	Literary Work
" 2, F	Underdrainage	Field Crops	Dairying			

The dates for stock judging may have to be changed to suit weather conditions.

T. F. Swindle, President, Orillia Junior Farmers' Improvement Association, and Irwin T. McMahon, who was a member of the inter-county stock-judging team, will give addresses on dates to be announced later.

The courses this year differed very little from those held in former years. One new feature, however, is worthy of notice, i.e., the holding of "mock auction sales" of live stock. For this purpose, the class was taken to a farmer's stables and asked to make private bids on a number of head of cattle, sheep and swine. Before the animals were offered for sale, they were valued by experienced live-stock men, and the results of the boys' work were based on the information thus secured. In some

cases, one animal of each class was taken before the students,—discussed and valued by the valuers in order that the class might have something to guide them in valuing the other animals brought before them. Where this work was carried on it was found to be very popular with the students and undoubtedly had great educational value. The Department will make a special effort to have these sales held in connection with courses in agriculture in future.

SHORT COURSES IN STOCK JUDGING

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT OF INSTITUTES

ALTHOUGH short courses in stock judging have been held in Ontario for several years, those held during the past winter were superior to all previously conducted in interest taken and in the class of stock available for demonstration purposes, while the attendance was the largest for several years. With a few exceptions, the live stock used at the courses during 1916-17 was exceptionally suitable for demonstrating the types best adapted to Ontario conditions, while the Department demonstrators were all experienced stockmen and eminently qualified to give valuable information to Ontario breeders.

During the season of 1916-17 there were eighty-four short courses in stock judging held in thirty-two counties of the province. These courses occupied one hundred and sixty-five days in all. Final arrangements were made in most cases by the District Representatives. Considerable interest in these courses has also been manifested by the Boards of Agriculture, and the officers of these boards have given valuable assistance to their District Representatives in completing plans for the holding of successful courses. Approximately 14,750 farmers attended these courses during the past winter.

Not only have the live stock demonstrators aimed at giving instruction in the judging of the classes of stock used for this purpose, viz., heavy and light horses, beef cattle, dairy cattle, sheep, swine and poultry, but lectures were also given on breeding, feeding and care of live stock; treatment of blemishes and diseases; market classification of horses; market requirements of animals used in meat production; best methods of breeding and finishing baby beef; the type and finish of the bacon hog; the marketing of lambs; care and market-

ing of wool; the management of poultry, while demonstrations in the approved methods of killing and dressing poultry were given by the poultry experts.

During the past season, a few boards of agriculture, that had several live farmers' clubs in their district, utilized the Department demonstrators for holding afternoon short courses for the benefit of club members, while evening meetings were addressed by the live stock instructors on topics of general interest to the farmers as well as by a women's institute delegate, who gave an address on some subject of special interest to the women present.

At many of the short courses the District Representative had arranged to hold a judging competition for the members of his Junior Farmers' Improvement Association. These were conducted by the live stock expert in charge and suitable prizes were given to the winners. In a few cases a valuable cup was donated to the winner by local stockmen. At other courses the young men of the community were induced to take an increased interest in judging by taking part in a mock auction sale. These sales, besides instructing the young farmers in wise bidding, also were of considerable value in giving the bidders an idea of values. Prizes were also given in these contests.

In a few cases a winter horse show was held in connection with a short course. While weather conditions were not always favourable, interest in live stock was sufficiently great that attendance and entries at these shows were very satisfactory.

Many evening meetings were held in connection with these short courses. Besides discussing live stock and other agricultural topics at these evening meetings, special instruction was frequently given by special speakers sent by the Department to

discuss topics of special interest to the farmers of the district, while in a few cases valuable assistance was given at these meetings in the organization of farmers' clubs.

DEMONSTRATION-LECTURE COURSES

While the nine hundred local branches of the women's institutes have been devoting a large part of their time to patriotic and red cross work since the war began, many of these institutes have found that demonstration-lecture courses have stimulated interest and effect along patriotic lines. During the past winter there were twenty-six courses held in food values and cooking; twenty-two branches had instruction in home nursing and twenty-seven took advantage of the course in sewing. At these seventy-five courses there were 2,700 enrolled, while the total attendance at all classes was 25,870.

Local branches were only required

to supply a comfortable meeting place, furnished with stove, tables, etc., while the Institutes Branch of the Department of Agriculture, supplied each instructor with all equipment necessary for successfully conducting the courses.

Each course covered a period of from two to three weeks, and was composed of a series of ten lectures. The domestic science course is intended to give information on the food values and cooking of vegetables fruit, milk, cereals and cheese, eggs, meat, bread, cakes, puddings and salads. The course in home nursing is intended to instruct the women in rural districts in the art of nursing the sick, caring for children, the administration of foods and medicines, while the subjects of sanitation, ventilation, bandaging, etc., are fully considered. Instruction in sewing covers such subjects as stitches, button holing, tailoring, drafting, cutting and dress-making.

MANITOBA

BY S. T. NEWTON, B.S.A., SUPERINTENDENT, EXTENSION SERVICE

SHORT course schools in agriculture and home economics were held during the past winter in Manitoba under the joint direction of the Department of Agriculture and the Agricultural College, and a great measure of the success of the work is due to the active support received from both. Altogether nineteen schools were held, and judging by the number of students who were present and the regularity of attendance, this intensified form of education is destined to very materially widen the influence of the Agricultural College.

For a number of years the gas engine has played quite an important part in the work on the Manitoba farms, and, due to the large enlistment from the farming communities, a considerable number of these en-

gines were likely to remain unused just when they were needed most. This fact led to gas engine instruction being made the central feature of the short course schools. The services of six gas engine experts were secured, and they were kept busy throughout the winter.

Five lines of agriculture were offered, and each class was permitted to choose the two subjects that were likely to be of most service to the district. The courses offered were:—live stock; field crops; dairying; poultry raising and horticulture. Altogether twelve instructors were engaged on this part of the work.

The gas-engine instructors were:—A. C. Campbell, F. F. Parkinson, J. Wade, A. C. Lawson, W. Ferguson and J. Smythe. The live stock lecturers included,—Geo. H. Jones,

H. S. Smith, A. J. Mackay, Dr. Shoulta; field crops,—W. T. G. Wiener, J. A. McGregor and H. Hicks; dairy,—W. J. Crowe and I. Villeneuve; poultry,—J. E. Bergey; horticulture,—J. A. Neilson; bees,—R. M. Muckle.

A car-load of equipment, including gas engines, very kindly loaned by the various Gas Engine Companies, was taken to each school, and, in addition to these, from six to ten engines, most of them very much out of repair, were brought in from the surrounding farms, and these provided practical work of a very real character. At the end of the course

the staff of the Agricultural College for the whole community, on such subjects as bee-keeping, rural co-operation, weed eradication and diversified farming.

Four of these courses were held in districts where the English language was not the native language of the people, and these were found to be amongst the most successful. The language question did not prove a very serious handicap, as the majority understood enough English to assist the few who had a little difficulty in this respect. A great deal of the work was of a practical nature, and as a liberal use was made of



SHORT COURSE STUDENTS AT ST. PIERRE, MAN.

every engine brought in was in good running order.

For the most part the engines used were of the stationary type, but two or three small tractors were taken to each place, and it was not an uncommon sight to see these tractors ploughing through two feet of snow with the mercury from 10 to 30 degrees below zero.

Approximately 45 per cent of the time was devoted to gas engine work, the other 55 being spent on the agricultural subjects.

Each Friday evening special lectures, generally illustrated, were given by the president and members of

charts and lantern slides, everyone seemed to get a good grasp of the subject. The people were so well pleased that an urgent request has been sent in to the Department of Agriculture to have similar courses held next year when they guarantee even a larger attendance.

Home economics short courses are carried on throughout the entire year with the exception of harvest time. During the winter a number of these courses were held in conjunction with the agricultural short courses. A choice of any two of the following subjects was offered:—dressmaking, millinery, cookery and home nursing,

and one week only was devoted to each of the two chosen. Our experience has been that one intensive course extending over one week followed by the other course on the following week is much more satis-

A fee ranging from 50 cents to \$2 was charged at each place, and proved sufficient to pay for hall rent, drayage, gasoline, cylinder oil, and, in general, all local expenses.

One of the most successful courses



CLASS OF BOYS AT WINKLER, MAN., WITH CARLOAD OF MACHINERY USED IN SHORT COURSES

factory than to have the two courses running concurrently.

In general, the courses were held under the auspices of the agricultural society and the home economics society, but in a few cases the school board took charge of local arrangements.

held was in connection with the Brandon normal school. The whole two weeks were devoted to field husbandry work under the direct supervision of Professor Harrison of the Agricultural College staff, and those who successfully completed the course were given first year standing



AT ST. PIERRE THE LADIES TOOK SPECIAL LECTURES ON GAS ENGINES

in this subject at the Agricultural College.

There is a strong tendency at present in Manitoba for the high schools to open their doors to the young men and women, and the adults in the community who have no prospects for either college training or a full high school course. These high schools will thus become the college of the people.

Those who attended the short courses last winter were there for a definite purpose, and there is no doubt but that a great deal of helpful

instruction was crowded into the two weeks, and that a desire to carry on independent study has been very materially stimulated.

The short course schools commenced about the middle of November, and continued until the end of March, with three schools generally running at the same time.

The following list gives the attendance at the regular classes. There was an additional attendance at the special lectures, and for evening meetings:—

Place	Sessions	Number Registered		Aggregate Attendance	
		Men	Women	Men	Women
Whittemouth.....	18	38	20	615	324
Beausejour.....	20	42	30	756	540
Brandon (Field Crops).....	30	36	3	972	87
Winkler.....	20	58	38	1044	684
Souris.....	20	62	20	1116	360
Gilbert Plains.....	20	52	25	936	450
Holland.....	20	48	56	864	1008
Portage la Prairie.....	15	2	60	30	870
Portage la Prairie.....	20	64	45	1152	810
Plumas.....	20	36	38	648	684
Deloraine.....	20	42	52	756	468
Brandon (Normal).....	21	—	60	—	1260
Brandon.....	20	38	38	760	688
Killarney.....	20	30	30	600	541
Boissevain.....	20	34	56	578	1002
Birtle.....	20	68	39	1101	700
St. Pierre.....	20	73	77	1095	1386
McCreary.....	20	38	33	760	586
Roblin.....	20	57	25	1025	450
Woodlands.....	17	18	—	350	—
Totals.....	401	836	745	15,158	12,898

COURSES IN HOME ECONOMICS

THE year just closed has been one of steady progress along home economics lines. The men being particularly busy owing to the extreme shortage of help, it was felt that extra attention could with advantage be given to women's work, since the women were endeavouring to shoulder as much of the farm work as possible even though it is well known that they already had as much work to do as an ordinary human being could be expected to do. However, no attention has been paid during the year to

personal convenience and everyone has done cheerfully as much work as possible, consequently, the short courses have proved of splendid service to over 4500 women, who each attended from one to fourteen sessions during the year.

Owing to the fact that the whole province is pretty well organized for patriotic effort we have not pushed the organization of home economics societies. Nevertheless, twenty new societies have been added to the list and these have naturally added to the number of requests for short

courses, of which there were no less than 229, each of not less than one week's duration. Generally on Monday either an afternoon or evening session was held and frequently an extra evening session on Friday or a morning session on Saturday forenoon. Each session ranged from two hours to four hours, the shorter sessions being in connection with home nursing and cookery.

ARRANGEMENTS

At all the short courses the local community made provision for a hall, heating, lighting and advertising. They also provided a number of sewing machines for the dress-making courses as well as tables, patterns, mirrors, etc., and for the cookery demonstrations, a coal oil burner and fuel.

For the dressmaking and millinery courses the women provided their own material, as much as possible being purchased from the local merchants. The millinery demonstrators were, however, obliged to take with them certain materials, such as wire, buckram and such other ma-

terials as could not be obtained locally.

The attendance at all these courses was uniformly regular, being well over 90 per cent for eight or nine sessions.

The home-nursing courses proved very popular, especially in the country districts.

The number of short courses in cookery and canning was smaller but the number of single demonstrations was much greater, these two subjects lending themselves better to the one and two-day meetings than dressmaking or millinery, which each require at least one week for satisfactory work.

During June and July fully 300 canning demonstrations are being planned for in order that the people will have first hand information in saving, by the canning method, the vastly increased garden production which is confidently anticipated. The following table is a statement of the subjects studied and attendance at the various courses held from March 31st, 1916, to March 31st, 1917:

SUBJECTS AND ATTENDANCE

DEMONSTRATOR	Subject	Number of Courses	Sessions (2 Each Day)	Attendance
Miss M. Smith	Dressmaking	35	315	7,875
Miss C. Senior	"	40	360	8,640
Miss E. Blackburn	"	14	126	3,150
Mrs. Abel	"	10	80	1,840
Miss Price	"	5	45	900
Miss McConnell	"	5	45	870
Miss H. Gowsell	"	6	44	660
Miss M. Fenner	"	6	30	690
Total		121	1,045	24,625
Mrs. C. Graham	Millinery	30	270	5,400
Miss E. Blackburn	"	20	180	4,680
Miss M. Smith	"	8	40	1,078
Total		58	490	11,158
Miss E. Crawford	Cooking		221	7,735
Miss R. Atkinson	Cooking and canning		150	4,800
Total			371	12,535
Miss Clarke	Home nursing		280	5,600
Grand total			2,186	53,918

TWO MONTHS' SHORT COURSE IN FARM ENGINEERING

BY J. B. REYNOLDS, M.A., PRESIDENT, MANITOBA AGRICULTURAL COLLEGE

WITH the ending of March closed the first long special course in Farm Engineering given in Canada. It was tried somewhat as an experiment, it being felt that the old three weeks' courses in tractioneering, that the Manitoba Agricultural College has been giving annually for over ten years, were not long enough to get the best results. The attendance proved that many farmers were feeling the need of this more extensive mechanical training, even to the extent of being willing to spend two months in the winter to that end. Seventy-six men enrolled for the course and nearly fifty more would have come had they but known in time, or had there been sufficient accommodation.

The days were spent in the shop and engine laboratories and with practical lectures, while the evenings were largely given over to basketball, wrestling and reading in the library. Nor was the literary side neglected. In addition to the lectures in English literature given by President Reynolds, the short course men organized a literary society and held many debates.

The students appreciated the shop visits in Winnipeg. Members of the

Agricultural Engineering Department took them on inspection trips through the following places of interest, many of which are not open to the individual visiting the city:— Ford Assembling Factory, seeing the assembling of the Ford car; Vulcan Iron Works, where the big shells are made and where the boiler shop and foundry present wonders to the uninitiated; the Winnipeg High Pressure Gas Producer Plant, with its big fire pumps for the protection of the business district; the Winnipeg Electric Steam Plant, with its six thousand horse power steam turbines waiting to pick up the load should anything fail at the dam on the Winnipeg river; the *Free Press* and the mechanical mysteries of the wonderfully complex newspaper business; the Manitoba Bridge and Iron Works, deep in structural steel and shell making; and many of the tractor warehouses. The mysteries of the pit and grain trade were revealed, at least so far as the eye and the mind of the amateur might be able to absorb it.

WEEKLY TIME TABLE

The following is the weekly time table of the course:—

Mornings. 8.50-9.30		9.35-10.20	10.25-11.10	11.15-12.00
Monday	Engineering	English	A. Steam Lab.	
	Lecture		B. Gas Engines.	
Tuesday	“	Arithmetic	Building	Electricity.
		Farm Accts.	Construction	
Wednesday	“	English	A. Forge	
			B. Steam	
Thursday	“	Arithmetic	A. Forge Shop	
		Farm Accts.	B. Wood Shop	
Friday	“	English	Building	Engineering.
			Construction	
Saturday	A. Forge Shop		A. Gas Engines	
	B. Gas Engines		B. Forge Shop.	

Afternoons	1. 15-250.	2. 55-4. 30
Monday.....	A. Gas Eng.	Stock Judg.
	B. Stock Judg.	Forge Shop
Tuesday.....	A. Woodshop	Steam
	B. Steam	Woodshop
Wednesday...	A. Grain	Wood
	Judging	
	B. Gas Eng.	Grain Judg.
Thursday.....	A. Forge	Farm Imple. & Concrete.
	B. Farm Imp. & Concrete.	Forge
Friday	A. Wood.	Steam
	B. Steam	Wood
Saturday.	No work.	

students presented resolutions of thanks to the instructors, to those who kindly gave special lectures, to the firms for their visits of inspection and to the gas engine and tractor companies for their generous donations of equipment to the Department of Agricultural Engineering.

The place of usefulness of the two months' farm engineering course is assured. The problem will be for the agricultural colleges of Canada to provide sufficient accommodation for the many who are eager for the work.

At the close of the course, the

SHORT COURSES IN DAIRYING

BY E. H. FARRELL, INSTRUCTOR IN BUTTER-MAKING, MANITOBA AGRICULTURAL COLLEGE

A short course in dairying for creamery-butter makers, was held at the Manitoba Agricultural College from February 5th to February 23rd, 1917; and a factory cheese makers' short course from March 19th to April 5th, 1917. Seven creamery butter makers and ten factory cheese makers attended the courses.

While the attendance was not large, the students were all managers of factories and naturally took a deep interest in the work.

With both classes, lectures and laboratory work were taken. With the creamery class, special emphasis was made on the proper methods of pasteurization of cream, and experiments on the pasteurization of cream to different temperatures, the making and packing of creamery butter, judging and grading of cream and butter, making of ice-cream, milk and cream testing, the running of hand cream separators; and a few lectures and laboratory periods were given on boilers and engines. All those in attendance were successful

in obtaining a third class engineer's certificate.

The cheese makers' course opened with a convention of cheese makers and directors of cheese factories, about thirty men being present.

During this course the work covered a study of the best methods of handling different qualities of milk for cheese making, the making and use of cultures, grading and judging of milk and cheese, the testing of milk for adulterations, such as watering and skimming, and the best methods of paying for milk at cheese factories.

During both courses considerable time was spent on construction of creameries and cheese factories and factory management.

President Reynolds addressed the classes at different times, and his lectures were highly appreciated.

Altogether the short courses were a decided success. Practically all those in attendance expressed themselves as desirous of attending a similar course another year, should one be held.

SASKATCHEWAN

BY S. E. GREENWAY, DIRECTOR EXTENSION DEPARTMENT, COLLEGE OF AGRICULTURE

DURING the financial year ending March 31st, 1917, short courses in agriculture and conferences with the homemakers' clubs were held in the province of Saskatchewan, as indicated in the following table which gives the dates and the aggregate attendance. No short course in agriculture was held at the college this year, as it was not possible to find periods during which the staff would be available for lectures other than those delivered to the regular student body. The week usually given over to the short course at the college was devoted to the annual convention of live stock breeders' associations of the province, which met at the college this year for the first time.

The figures shown in the attached statements would seem to indicate a lack of interest, as there is a considerable falling off in the aggregate of

previous years. There has been no lack of interest however. The explanation is to be found in the fact that in former years it has been possible to hold as many as three sessions a day, bringing the aggregate at a four-day course in some instances up to 2,000. This year owing to the extreme scarcity of labour it was found rarely possible to hold more than one session a day, this being the extent of the time which the men from the farms could devote to the conferences. In a general way the work put on at the courses this year comprised practical field and animal husbandry topics, dairying, farm mechanics and rope work.

In addition to the courses indicated there was held a two-weeks' course in gas engineering at the College of Agriculture with a regular attendance of 200 students.

WOMEN'S CONFERENCES

Place	Date	Attendance
North Battleford	November 7	30
Prince Albert	" 10	25
Wilkie	" 13	40
Biggar	" 15	1
Nokomis	" 17	120
Elfros	" 20-21	50
Milestone	" 24	70
Swift Current	" 27	20
Wolseley	" 29	20
Moosomin	" 30	75
Maryfield	December 4	50
Carlyle	" 5-6	50
Alameda	" 7	120
Regina	" 12	70
Saskatoon	" 14	15
Total attendance		756

In addition to the foregoing women's conferences 59 short courses in agriculture were held from November 16th, 1916, to March 13th, 1917, covering 51 points within the province. The aggregate attendance at these courses was 7,311. At

a number of the places visited, namely, Battleford, Prince Albert, Yorkton, Moosomin, Moose Jaw, Swift Current, Weyburn and Estevan, separate classes were held for the Normal School students.

AGRICULTURAL SHORT COURSES AT NORMAL SCHOOLS

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATION BRANCH

WITH a view to awakening a greater interest in agricultural matters in the minds of those who shortly intend entering the teaching profession in Saskatchewan, short courses in agriculture were held during the past winter in a number of the provincial normal schools where third class normal work is taken up.

At the outset, it was recognized as essential to its success that this work should be in the hands of lecturers possessing first-hand information regarding agricultural problems and conditions throughout the province, and consequently an arrangement was made with the Department of Agriculture whereby the services of J. G. Rayner, B.S.A., were placed at the disposal of the Department of Education for the months of January and February. Mr. Rayner is a graduate of the Manitoba Agricultural College, and for the past three years has been engaged in district representative work in the North Battleford country, where he has come in close personal touch with many of the problems that are today uppermost in the minds of the

farming community. Mr. W. L. Kirkpatrick, a senior student from the Saskatchewan College of Agriculture also assisted with the work throughout. The following table shows where and when the short courses were held:

North Battleford.....	Jan. 8-12
Prince Albert.....	" 15-19
Yorkton.....	" 22-26
Moosomin.....	" 29-Feb. 2
Moose Jaw.....	Feb. 5- 9
Swift Current.....	" 12-16
Weyburn.....	" 19-23
Estevan.....	" 26-Mar. 2

In planning this work, the special lectures were arranged to occupy the forenoon session of the Normal course at each point for one week, the regular work being continued during the afternoon sessions. The following is a list of the special subjects covered by the short course lectures:

- Seed—Germination and plant growth.
- Choice and management of farm crops.
- The cause of low yields.
- The climate and its relation to Saskatchewan agriculture.
- Tillage in relation to crop production.
- Co-operative seed production.

ALBERTA

BY ALEX GALBRAITH, SUPERINTENDENT OF FAIRS AND INSTITUTES

THE Alberta short course schools of agriculture have been in active operation a good many years and the value of their work is being appreciated more and more every year. Some changes and improvements have been introduced from time to time in order to make the work more practical and to bring the lessons home more directly and forcefully to the farmer, and especially to the man who is giving live stock a prominent place in his farm-

ing operations.

The number of schools held in recent years has varied from ten to fifteen each winter, beginning the latter part of January and continuing well into March. Prior to 1915, the schools lasted one week at each point but since then we have reduced the time to three days, thereby enabling the staff to visit two towns each week.

The meetings are held in a tent, about eighty by forty feet, owned

by the Government and heated by stoves, and such parts of the province as have not been visited recently by these schools or the mixed farming train, or had the benefit of the regular established schools of agriculture, naturally receive the most favourable consideration in arranging the annual itinerary. The average daily attendance during the session recently closed was about two hundred and fifty, although in several instances the tent became overcrowded, with four hundred to five hundred people.

The subjects dealt with included draft horses—their history, characteristics, management and future prospects, and the same with regard to beef cattle and dairy cattle. Representative animals of all the leading breeds were carried on the train and exhibited in the tent, and most interesting discussions took

place at almost every point. The great benefit of having good animals present rather than a lecture on an abstract or absent subject appealed strongly to every visitor. Judging classes were held wherever practicable and the most valuable lessons driven home by the various members of the staff.

A new feature was introduced this year in connection with the swine department. After a lecture on the various breeds and types, Mr. W. F. Stevens, Provincial Live Stock Commissioner, superintended the killing and dressing of a fat hog at each place. The lard was duly rendered and sausages made and a great deal of practical information given thereby to the farmers, who showed their appreciation of this novel feature of the schools by requesting a repetition of it next year. This will probably be done.

BRITISH COLUMBIA

BY S. H. HOPKINS, B.S.A., ASSISTANT LIVE STOCK COMMISSIONER

OWING to the fact that enlistments had cut down the staff of available lecturers short course work was not extended this year. The staff of the Faculty of Agriculture of the University of British Columbia, co-operated with the Department of Agriculture in sending out speakers on live stock and crops. One course of ten days was held in the Okanagan district; the other places on the itinerary being limited to one or two days. As was to be expected, the most successful meetings were in those newer districts in the interior which are developing agriculturally. The meetings in the older settled districts near the coast

in most cases were not so well attended. In the fruit-growing sections the interest was found to be especially keen in live stock and mixed farming subjects.

Lectures and demonstrations were held at more than sixty points throughout the province. The subjects taken up were adapted to the locality, and included live-stock topics, dairying, mixed-farming crops, seed production, poultry raising, fruit growing and marketing, and live-stock ailments. This last subject, taken up by the Chief Veterinarian, was a new feature on the programme, and proved very popular.

FARM LABOUR

The acute situation in regard to farm labour is a matter that has received the earnest attention of every Department of Agriculture in Canada. In the following series of articles there has been brought together the plans adopted in a number of the provinces for the purpose of securing the farm help necessary for the forthcoming active season of production.

NOVA SCOTIA

BY ARTHUR S. BARNSTEAD, SECRETARY, DEPARTMENT OF INDUSTRIES AND IMMIGRATION

THE farm labour problem will assuredly be acute in Nova Scotia this year. Hitherto we have depended largely for extra farm help upon the immigration of agricultural new-comers from Great Britain. The supply of these is of course cut off, and, moreover, thousands of our young farmers are now engaged in military service overseas. Again, the services of many young men which would formerly be available are now fully engaged in our munitions factories and steel works. Thus the present outlook for securing, during the rush seasons, any extra help for our farmers from the usual sources is not encouraging.

It may be that numbers of townsmen can be induced to spend their vacation at work on the farms in the

summer. The employment of both male and female college students and pupils of our academies is also suggested. The amount of labour available in this way, however, would obviously not go far toward meeting the demand. It is also possible that some farm help may be secured among our fishing population.

The Secretary for Agriculture is suggesting a patriotic scheme whereby city men will be asked to furnish fertilizer to the farmers to increase the production of their farms. If this were carried out, a farmer who is without sufficient help would be able to raise more produce to the acre, although he would be unable to increase his production through a greater acreage under cultivation.

QUEBEC

BY J. ANTONIO GRENIER, DEPUTY MINISTER OF AGRICULTURE

THE Minister of Agriculture has decided to conduct a campaign to secure farm help by publishing in the papers of the province a blank form which the farmers are to cut out, sign and forward to the Department of Agriculture. The number of labourers wanted, the qualifications necessary, the salary offered and other details are to be given in this form. The forms will

be classified by special employees in the Department and distributed to the different employment bureaus of the province, which are under the control of the Public Works Department. These bureaux shall endeavour to recruit farm labourers, particularly in the cities, and send them to the farms, after communicating with the farmers, when necessary.

ONTARIO

BY W. A. RIDDELL, M.A., Ph.D., SUPERINTENDENT TRADES AND LABOUR BRANCH, DEPARTMENT OF PUBLIC WORKS, TORONTO

THE need for farm labour in Ontario is quite as acute as it is in any of the provinces. Evidences of this may be seen by such facts as the following:—

"We can use 500 farm labourers in our municipality," writes one reeve. The same mail brought an application for a boy in which it was stated "We could use a carload of boys in this neighbourhood."

The labour supply available consists of the men engaged in munition construction work, the men returning from the lumber camps, and the boys in our high schools, collegiates, etc. There is also some possibility of getting a few men from the United States.

With regard to the Americans, there are five men working in the United States at the present time urging men to come to Canada. In some cases their fare is advanced; in other cases they get the one-third first-class fare rate from the international boundary or from Toronto. So far the attempt to get men in this way has not been very successful, nor the men obtained very satisfactory. The class of men that can be drawn from the United States at the present time for farm labour is rather poor.

The Ontario Government is operating a system of employment bureaux throughout the province; zone bureaux are situated at Toronto, Ottawa, and Hamilton, while part time employment bureaux are located at Brantford, St. Thomas, Kitchener, London and Walkerville.

The District Representatives of the Department of Agriculture, about whose work more will be said later, are also acting as employment agents for farm labour.

This system of employment agencies covers the province and provides the best available method for linking up the man who wants to

work on the farm with the man who needs farm help. Applications pour into the bureaux literally from all parts of the world from farmers, some of whom have formerly lived in Ontario and want to come back to this province at the present time. One mail brought applications from New Zealand, Nova Scotia, England, and Oklahoma.

Another phase of the activities of the Trades and Labour Branch is the placing of 5,000 men from the city of Toronto on farms in the district. The majority of these are business men who have signified to the Board of Trade that they are willing to spend their vacations in the country, doing what they can to help. The Board of Trade has urged the employers to give as long holidays as possible to their employees with this object in view.

An extensive publicity campaign is being carried on through the Department of Agriculture and the Organization of Resources Committee. Appeals are made both to the farmers to produce more food, and to the available labour supply, particularly the high school boys, to enlist in this patriotic service.

In the farmer's magazines of the province, the advertising includes a reproduction of the form used for registering applications for farm help. Considerable response has been made to this form of appeal, although this particular phase of the publicity campaign has only been in operation a short time.

The boys between fourteen and eighteen in our secondary schools constitute the most promising supply of help available for farm labour in Ontario this summer. Even the most inexperienced boy, if only he has the will, can be of use. Many boys who went out last summer with no experience and only moderate

strength were decidedly successful. Representatives of the Trades and Labour Branch in the person of three university professors, have covered as many of the schools and collegiate institutes of the province as possible, presenting the plan to the principals, and practically everywhere they have met with enthusiastic response on the part of the boys, as well as on the part of the principals and teachers. No detail is being overlooked in the matter of providing for the proper treatment of the high school boy who goes on the farm.

The District Representatives of the Ontario Department of Agriculture, who have offices in practically every county in the province, represent what might be called "a court of appeal" for the boys in the matter of adjustments of minor difficulties as to wages, accommodation provided, etc. Even before the boy is placed on the farm, the District Representative reports as to the desirability of the farm, in order that a young boy may not be placed on a farm where there is work for two men. Then the Y.M.C.A.'s are co-operating by providing a physical examination of the boys before they are sent out to the farms, and by looking after the recreational life of the boy, wherever it is at all possible to do so. In cases where the boy specifies his religious denomination on his registration card, the clergyman of that denomination in the district to which he is going is notified by the branch.

Lest it might be gathered from the foregoing that the scheme is planned with overmuch consideration for the boy, and not enough consideration for the farmer, it may be stated, that the boy is given definitely to understand, that in accepting a position on a farm he is practically enlisting in an army of production, and, that being the case, he is expected to stick to his work, giving the farmer the best possible service within the limit of his energies.

In the matter of wages, a mini-

mum of \$12 per month with board, will be paid for the first two weeks of the engagement, after which the farmer will be expected to pay the boy as much as he has proved himself to be worth.

If the scheme proves a success during the coming months, as it undoubtedly will, there is no reason why it should not be continued in the years to come, with advantage both to the boy and the farmer. Not only the province but the nation will profit thereby.

Every effort is being put forward to convince the parents of the need of every boy enlisting for farm service. The Press will be used for this purpose, but in cases where the boys offer themselves, sign the registration cards and the parents refuse to do so, we expect to make a personal appeal through patriotic agencies to the parents. In this way we will likely get a large proportion of the boys over fourteen years of age engaged in other work. There is good reason to believe that between 3,000 to 5,000 boys can be obtained.

The Organization of Resources Committee inaugurated an essay contest on the subject "How can the Ontario school boy, by working on a farm this summer help, first—himself, second—the farmer, third—the Empire?" By the offering of prizes in every high school, collegiate institute, and secondary school, the interest and enthusiasm of the boys has been aroused.

The Y.M.C.A. has kindly offered its services in examining any of the boys as to physical fitness and urge them to go, and, where practicable, to organize weekly or fortnightly programmes for different rural districts, but with all these organizations undoubtedly there will be a shortage.

Of course it is understood that all the resources of the various branches of the Government are at the disposal of returned soldiers who may wish to go on the land, and it is believed that the shortage of labour will be partially made up in this way.

In conclusion, it may be stated, that while there is an undoubted scarcity of experienced help, the co-operation of every public body and organization in the province, working through the Organization of Resources Committee, the Department

of Agriculture, Trades and Labour Branch, and the Colonization Branch will undoubtedly secure results which will greatly minimize the lack of help, and so make it possible for Ontario to approach, if not to equal, her normal food production.

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE, AND THOS. M. MOLLOY, SECRETARY, BUREAU OF LABOUR

REALIZING that a limiting factor in our crop production this year is the shortage of labour a special effort is being made to recruit all available former farmers and farm workers to assist in putting in the crop. Special appeals are being made through the Press, by posters and from the pulpits to induce the largest possible number of urban residents to assist in this work. All municipal employees are likewise being asked to liberate as many of their employees as can be spared. On our request the railways have granted excursion rates for farm labourers from Vancouver and special rates are being put in force from Regina, Saskatoon and Moose

Jaw.

Ten special farm labour agents from this province are in the United States and are working in conjunction with a like number of special agents sent from this province by the Dominion Immigration Department. In order to facilitate the work of these special agents an arrangement has been made whereby *bona fide* farm labourers may obtain a rate of one cent per mile from St. Paul, Duluth and Spokane to points in Saskatchewan. This rate is made available by an arrangement whereby the Provincial and Federal Governments reimburse the American railways for the difference between the one cent rate and the regular fare.

FARM LABOUR CONFERENCE

A conference took place at Regina on February 28, with the National Service Directors regarding farm labour, which was attended by Mr. R. B. Bennett, National Service Director; Mr. A. L. Haining, Director for Saskatchewan; Hon. Mr. Motherwell, Hon. C. A. Dunning, Mr. F. H. Auld and Mr. T. M. Molloy for the Government; Mr. Maharg, President of the Grain Growers' Association, and Mr. J. Robinson, Director of the Saskatchewan Co-operative Elevator Company.

Mr. Bennett pointed out that there was every probability of an increased shortage of foodstuffs before the next harvest in Great Britain, France and

Italy, and in view of the fact that Canada is the nearest of the Dominions, it is naturally looked to as the first source of supply from which that shortage might be made good. In turn, it is the province of Saskatchewan, as the greatest exporter amongst the provinces of the principal foodstuffs required, upon which the burden of the extra production will naturally fall. The chief difficulty in the way of realizing these expectations is the shortage of labour, and extraordinary efforts have been and will be made to supply the deficiency. Even if wages should be a little higher than last year, the prospects for high prices were never

better. It is absolutely necessary that our production should be greatly increased this year, and Saskatchewan farmers are sufficiently keen business men to realize their opportunity and their sense of patriotism will cause them fully to discharge the responsibility laid upon them.

As a result of plans now far advanced Saskatchewan farmers may rest assured that their labour needs will be supplied, and may make their plans for the season's work with every confidence. The first step, however, is for farmers to make their needs known.

The Bureau of Labour has for some time been busily engaged in the problem of providing farm labour at seed time. The shortage of labour is probably greater than has yet been experienced in this province. In addition to the employment offices, which have for some time been operated by the bureau, others are being opened in Regina and Moose Jaw, and a temporary one at Prince Albert at which farmers in need of help and labourers in need of work should register.

Arrangements have been made with the different railway companies for a rate of one cent per mile from

all the ports of entry along the United States boundary. This is an unusual concession at this time of year, and it is hoped that it will result in obtaining a large number of men from the States to the south of us.

These farm labour excursions serve several good ends. They help our own farmers out of their difficulties; they give many an opportunity to see Saskatchewan at a small expense and provide work for them at good wages; and as a proportion of these men remain to take up permanent residence amongst us, these excursions help to meet one of Saskatchewan's greatest needs, which is to increase our agricultural population. In this connection a few statistics of what has been done in the past two years will be found interesting. Free permanent employment bureaux were conducted at Regina and Saskatoon, and temporary ones at Moose Jaw and Winnipeg. The number of men brought into Saskatchewan to work on farms in 1915 was 19,837, and in 1916, 26,607. Labourers from Saskatchewan cities to the number of 7,262 were secured in 1915, and in 1916, 6,603. The cost of securing this labour in 1915 was \$3,670.12, and \$3,175.00 in 1916.-*Public Service Monthly, March, 1917.*

ALBERTA

BY H. A. CRAIG, B.S.A., DEPUTY MINISTER OF AGRICULTURE

DURING the past winter, those who were interested in increased agricultural production have been anxious about the evident scarcity of farm labour. Owing to the fact that so many young men from Alberta have enlisted for overseas service, the available supply is much less than the requirements. Realizing this, the provincial Department of Agriculture sent the Chief Publicity Commissioner and his assistant to the United States in February to investigate the possibilities of securing

labour. These men reported that the labour could be secured provided that several agents were sent from the province to canvass. Accordingly, the Department arranged for five men to work in the north-western and central states.

The Director of National Service visited Edmonton with a view to giving whatever assistance was possible in the securing of this labour. Mr. Bennett was instrumental in arousing considerable interest and in having the Dominion immigration officials both in Canada and the

United States co-operate with the three Western Provinces.

Special railway rates of 1c. a mile have been arranged by the railway companies from Duluth, St. Paul, Spokane and from British Columbia points to any part of Alberta. Provision has been made for certificates signed by the Dominion officials to be handed to those wishing to come to Canada, on which is stated the fact that the bearer will not be required for military duty while in Canada, and may return to the United States any time he chooses. It has also been arranged that the time spent in working for farmers will be accepted in lieu of time required to be spent on homesteads. Extensive

advertising has been carried by the Department of Interior in United States papers. The result of this campaign of both the Provincial and Dominion Governments has been most satisfactory.

At the time of writing, about 2,300 men have passed through the three labour offices of the Provincial Department which are located at Edmonton, Calgary and Lethbridge. It is possible that another thousand men will be required and we fully expect that they can be secured. The labourers that have already arrived are all experienced men who know how to handle western machinery. The wages offered range from \$40 to \$50 a month.

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

THIS Department has been appealing to the farmers in various ways to increase their production, both of stock and crops, and we are trying to show the farmer how, by adopting the principle of breeding from selection, the weeding out of undesirable animals, and only keeping the best, he may secure better and more productive stock. Similarly with crops,—we have been endeavouring to show how, by planting the right crops on the right soil, by preparing the ground thoroughly, by using only the best selected seed, and generally by the adoption of the right cultural methods, he may largely increase the yields of crops from the same acreage.

The labour question, however, is the great difficulty, and the debarring factor at the present time to increased production. The farmer realizes that it is his patriotic duty to do all he can to increase the supplies of food-stuffs, and would do so could he secure the necessary labour. It is a very acute question in British Columbia just now, and what is the best solution it is difficult to say.

It seems to me that the only practical solution in sight is that we organize to the best of our ability our home supply of labour. We will have to do as they are doing in Great Britain, France, and other countries of Europe at the present time,—get our women and boys and girls to help in the harvest field and in our fruit orchards. The establishment of a labour bureau in the city of Vancouver, which, of course, is the distributing centre for this province, has also been suggested, and it is likely that steps will be taken to form such a bureau. By it those requiring help on the farm could be put in direct touch with those who wish to work, and, whilst it would not fully meet the situation, this would undoubtedly prove an assistance.

The Department of Education has arranged for an extension of the school holidays, so that our boys and girls may be enabled to help in harvesting the fruit crop.

The restrictions on farm labour coming into the province should, in my opinion, be instantly removed, but even if this were done, I do not

think it would make a very great difference, as they are facing the same situation in the United States, and labour for the farm is also scarce there.

It is not only the farmer who is suffering from scarcity of labour. Our mines, logging camps, mills and other industrial works, are all complaining that they cannot get the labour that they want for carrying on their work to the fullest extent. It must be remembered that approximately 35,000 men have left

this province for overseas service since the war began.

I certainly think that this is a time when we would be justified in adopting extreme measures. Agricultural production must be increased. It is by so doing that Canada will be best helping the Motherland, and to do this, it is, of course, essential that the labour is available. Farmers are doing the best that they can, and working double time, but there is a limit to their individual efforts.

NEW BRUNSWICK

SECRETARY FOR AGRICULTURE APPOINTED

THE position of Secretary for Agriculture in the province of New Brunswick, left vacant by the resignation of Mr. J. B.

Daggett, has been filled by the appointment of Mr. W. R. Reek, B.S.A.

Since his graduation from the Ontario Agricultural College in 1910, Mr. Reek has had a successful career. Upon graduation he acted for a time as Private Secretary to the late Dr. C. C. James, who was then Deputy Minister of Agriculture for Ontario. Leaving there Mr. Reek acted as an Immigration Official in London, England, for the Ontario Government. Upon his return to Canada he was appointed Associate Professor of Animal Husbandry at the Ontario Agricultural College. In 1915 he became Director of Agricultural Instruction for Prince Edward Island. For the past two or three months he has acted as Assistant to Dr. G. C. Creelman, Commissioner of Agriculture for Ontario, which position he leaves to assume his duties as Secretary for Agriculture in New Brunswick.



W. R. REEK, B.S.A.

QUEBEC

POULTRY FATTENING AND CO-OPERATIVE SELLING

BY REV. BROTHER LIGUORI, OF THE HORTICULTURAL DIVISION, QUEBEC

BREEDING and systematic fattening of poultry are part of the work of the Poultry Experimental Stations, which number about twenty-five throughout the province of Quebec.

The co-operative system of fall fattening of chickens is not, as yet, under full operation. Up to the present, the farmers have simply brought their finished chickens to the Station. These chickens are examined by the superintendent, who sells, under the Station's brand, those that are satisfactory, and keeps a slight percentage of the receipts, sufficient to cover expenses. However, in certain districts, expert poultry men, trained by the Station, and who turn out well-prepared products of uniform quality, may be allowed by the superintendent to use the Station's brand. Under this system, the products of the district have made for themselves a reputation with the purchaser quicker than they otherwise would have.

The system generally adopted, however, is the following: During the fall, the unfleshed chickens of the district are purchased for cash. These chickens are fattened and sold by the Station, which keeps the entire receipts.

Experience has shown that the Station has no difficulty in getting chickens during the first and even during the second year of operation. From the second year on, however, it is not so easy to get supplies, and the third year, although many more chickens are bred in the district than at first, fewer are offered to the Station. Why is this? Because the farmers visiting the Station are not slow

in realizing that there is far more money in selling well-finished poultry than unfinished poultry. The whole process of fattening is carried on as an object lesson to the farmers. Above each fattening crate, which contains twelve chickens, there is a large card giving the following indications: breed of chickens, date of beginning of fattening, when put in the crate, weight after a week of feeding, number of pounds of meal, of milk and other feed consumed, with exact cost of same. A similar detailed statement is tacked above the crate at the end of the second week, and another again after the third week, when the chickens are generally killed. Then the live weight of the chickens is put on the card, as well as the weight killed and dressed, and the total receipts for sales. All this is a splendid object lesson for the farmer, and this is why after the Station has operated for a couple of years, the farmers prefer to feed their own chickens rather than to sell them unfinished to the Station.

CO-OPERATIVE SELLING

Although no co-operative scheme of feeding has been adopted as yet, co-operative selling is being carried on on a rather large scale, especially through the Quebec Cheesemakers Co-operative Association. The products of the Poultry Co-operative Associations, of the Stations and even of the individual members of the associations, are purchased and shipped to the association warehouses in Montreal, and the producer receives the full price, minus a very small percentage, of about 5 per cent,

for handling expenses. The business of the co-operative association increases every year, for eggs and chickens, alive or slaughtered. The manager, Auguste Trudel, is now studying a scheme of co-operative breeding and fattening, which he hopes to put in practice at the two

co-operative slaughter-houses of the association, Princeville, Arthabaska county, and at St-Valier, Bellechasse county. This scheme would permit of making profitable use of the various by-products, blood, bone, etc., of these slaughter-houses.

NOTES.

In view of the steady and continual increase in the prices of eggs and poultry, the Poultry Division of the Department of Agriculture of Quebec has published, for free distribution, a list of the principal breeders of pure-bred poultry and rabbits in the province. This publication will doubtless be of great value to all poultry breeders, especially during the spring.

Every spring, many persons interested in breeding do not know where to apply to get breeders or eggs for incubation of their favourite breed or strain. They will be able to pick out in this list the flocks which are the nearest to their residence and this is a very important point, owing to the difficulties of railroad transportation.

Drainage plans will again be prepared free of charge this year by experts of the Department of Agriculture, for all farmers applying for the same. A large number of such plans were prepared last year and several farms were drained in part. In a few years from now, the result of these demonstrations should greatly encourage the practice of underdrainage.

Before the beginning of the season of inspection, which opened April 15th, fifty inspectors and five assistant inspectors of creameries and cheese factories took a week's course at the School of Agriculture of Ste-Anne de la Pocatière. Lessons were given on the main

points of breeding in connection with the dairying industry, so as to enable these inspectors to give during the following season, information on this point to the makers and to the patrons.

The preliminary compilation of dairy statistics for the year 1916 has just been completed at the Quebec statistics office. It is gratifying to observe that the value of this production is about \$3,500,000 higher than 1915; the total value is \$21,899,401. The number of factories, which reached a total of 2,142 in 1910, has been reduced to 1,983 in 1916. A number of small factories have thus been closed. This increase in the total value of our dairy products is due mainly to the increase in the prices of butter and cheese. However, the new system of inspection, under the direct control of the Department of Agriculture, has also greatly helped by facilitating the compilation of statistics of this important branch of our agricultural production.

Two sugar-making schools, supported by funds furnished under THE AGRICULTURAL INSTRUCTION ACT, are open this season to young men, who desire to perfect themselves in making maple sugar and syrup. A number of sugar houses will be visited by instructors, who will give practical demonstrations on the making and the marketing of pure maple products.

An appeal to the patriotism of farmers and student gardeners has been made by J. H. Lavoie, Chief of the Horticultural Division, showing the necessity of making the best use of our cleared areas in Canada, in order to increase the agricultural production. This Division has also dealt with the question of workmen's gardens and vegetable gardening in the cities in order to help the owners of vacant lots. The causes of failure and success have been discussed in the principal newspapers published in large centres.

In an article on "Spraying Experiments" published in THE AGRICULTURAL GAZETTE for March, 1917, (Vol. 4, No. 3), an account is given by Mr. J. H. Lavoie on pages 196-198, of the spraying experiments carried on in the province of Quebec. In this article it is stated (page 197) that an active campaign is carried on against "The Apple worm, Gipsy moth and Apple scab, these being the greatest enemies of our orchards." This is a clerical error and should have read "The Apple worm, Apple curculio and Apple scab." The Gipsy moth, fortunately, is not present in any part of Canada at the present time.—*Editor.*

ONTARIO

THE ORGANIZATION OF RESOURCES COMMITTEE

BY ALBERT H. ABBOTT, SECRETARY

ON April 20th, 1916, a bill was passed in the Ontario Legislature providing for the creation of a provincial committee to secure the organization of the resources of Ontario, for efficient co-operation with the Federal authorities in the prosecution of the war and the maintenance of the agricultural and industrial production of the province.

The committee appointed at that time consisted of His Honour, Sir John S. Hendrie, Lieutenant-Governor of Ontario, and ten members of the House, chosen from both political parties. In February of the present year thirteen members outside of the Legislature were added to the committee.

At the present time, the purpose of the committee is expressed in the Act, as follows:—

"To aid in securing the conservation, utilization and organization of the resources of Ontario for the successful prosecution of the war, and to secure the maintaining and increasing of the agricultural and industrial

production of Ontario, and the better development of the natural and other resources of the Province during the war and thereafter."

During the summer of 1916 a good deal of preliminary work was done in ascertaining the various patriotic committees and organizations operating throughout the province. A survey of the labour conditions in munitions plants was also undertaken, with a view to attempting to do what was possible to meet the need for skilled labour in the production of munitions.

On the appointment of Mr. Mark H. Irish as Director of the Department of Labour by the Imperial Munitions Board, the information so gained was handed over to him.

When the second appeal from the British Red Cross Society was to be presented to the province, the Government handed the organization over to this committee, and as a result of its labours \$1,656,234.33 was collected and transmitted to England by February 1st, 1917.

As soon as the additional members

were added to the committee, in February of this year, active steps were taken to ascertain the conditions obtaining relative to farm labour, and since that time the committee has been actively engaged in doing everything possible to secure farm labour for the present season.

The committee is working in the closest co-operation with the Department of Agriculture and the Trades and Labour Branch of the Department of Public Works of Ontario, and it is hoped that through the efforts being put forth the food production of the province will be ma-

terially increased. It is yet too early to speak of the results, but enough has been accomplished to show that the work of the committee is bearing fruit, both in encouraging farmers to sow to the limit of their ability and inducing employers in the cities and towns to do what they can to release men for farm work. The boys of high school age in the province are also being appealed to through the schools, and a good deal of interest is being aroused. The exact number who will volunteer for farm service is, however, not yet known.

HORTICULTURAL EXPERIMENT STATION, VINELAND

VEGETABLE SEED PRODUCTION

TO demonstrate the possibilities in home-grown seed and the best methods of raising such vegetable seed, considerable work in vegetable seed production was outlined and started in the spring of 1915, and is being continued and enlarged each season. The original stock of Yellow Globe Danvers and Denia onions, and Detroit Dark Red beets and Chantenay carrots, is being used largely in this work, with the addition of the following varieties of vegetables: Danish Ballhead cabbage; Giant Pascal and Paris Golden celery; Dwarf Erfurt cauliflower; Red Globe and Red Wethersfield onions; Hollow Crown parsnip; radish and salsify.

In conjunction with the work in vegetable seed production, seed selection for improved type is also being carried on.

The seed produced in 1915 was used for most of our 1916 crops with the addition of a few others for comparison. Also a considerable amount of seed was distributed for testing to a large number of growers, who reported on this seed at the end of the season. Some forty reports have been received, and without exception

all speak very highly of the quality of the seed, the germination, in most cases, being 20 per cent or better than other seed. Carrots, in a few cases, proved to be low in germinating power.

Very fair success attended the production of cabbage seed of the Danish Ballhead variety. A number of selected heads were placed in a bed with the root stock attached in the fall of 1915. A light covering of earth and snow was all the protection given. The heads came out in good condition in the spring, and only a very small number failed to grow after being set in the row. Many of the heads required cutting or slitting to allow the seed stocks to burst through. Later in the season, the tops required to be supported with stakes and strings. Seed ripened in late August and was harvested by making several cuttings.

Celery seed was produced with most success by planting the plants in the greenhouse during the late fall from the field. They began to grow in early spring and produced a large quantity of seed by the end of July. A number of plants were stored over winter in a trench, and some which

lived over in a cellar storage were planted out in the open in the early spring. A fair quantity of seed was produced, but the growth of the plants and the seed produced was not as good as obtained under the first system outlined above, where the seed was produced under glass.

Cauliflower seed was produced from plants which had just started to head in the late fall, and which were taken up from the field at that

time and planted in a cool greenhouse over winter. The plants were left in the greenhouse, and in early spring seed stocks were sent up from which ripened seed was secured in July.

An attempt to produce cauliflower seed outside from early plants resulted in failure, owing to the weather being backward at the time of blossoming and setting seed.—*Fruit Branch Circular, March, 1917.*

BRITISH COLUMBIA

COST OF PRODUCTION SURVEY

ONE of the greatest problems before any farming community is that of determining the most profitable crops for the farmers of that district. The initial step in the solution of this problem is the determination of the exact cost of producing the various crops which are grown in that district.

With a view to determining the exact cost of producing the various crops in different parts of the province the Department of Agriculture has decided to repeat the offer made last year: i.e., that a bonus of \$5 will be paid to all prize-winners in the field crop and seed production competi-

tions, who shall submit a satisfactory record of the cost of producing the crop entered in the competition before December 1st, 1917.

REPORTS SUBMITTED IN 1916

One hundred and two reports were received during 1916 on the cost of producing the various crops grown in the field crop competitions. The majority of these were submitted by those winning prizes in the competitions.

The following table gives the yields obtained and the cost per ton to produce each kind of crop:—

	No. of reports	Highest yield per acre	Lowest yield per acre	Average yield per acre	Highest cost per ton to produce	Lowest cost per ton to produce	Average cost per ton to produce
		Tons	Tons	Tons			
Potatoes (field-crop competitions)	46	23.25	3.5	9.85	19.59	\$ 2.50	\$ 9.77
Potatoes (boys and girls)	38	20.00	4 0	9.94	15.10	5.00	9.64
Wheat	4	2.35	1.0	1.46	26.79	13.85	19.12
Oats (threshed)	3	1.25	1.0	1.15	24.29	17.09	20.70
Oat hay	4	2.25	1.75	2.00	9.74	4.45	7.64
Corn	2	15.00	15.00	15.00	1.23	1.15	1.19
Carrots	2	20.00	20.00	20.00	3.71	2.92	3.31
Kale	2	20.00	18.00	19.00	4.97	1.96	3.46
Barley	1	0.14	0.14	0.14	31.94	31.94	31.94

NOTE.—The last entry showing one report on the cost of producing a ton of barley is rather high, due to a 20 per cent loss at the time of harvesting.

It is interesting to compare the reports on the cost of producing potatoes submitted by the competitors in the field crop competitions with those submitted by the competitors in the boys' and girls' club competitions. It should be remembered that the majority of the above reports have been submitted by those winning prizes in the field crop competitions, and conse-

quently were submitted by the best farmers, while in connection with the reports submitted by the boys and girls only those reports showing a crop failure were omitted.

It is also interesting to note that the records submitted on the growing of the potato crops show that, among the forty-six farmers submitting reports, nineteen different varieties were grown. The Carmen No. 1 variety was grown most extensively, with Gold Coin and Burbank following close in the order named.

NOTES

BY J. ROY McLENNAN, EDITOR AND CHIEF, PUBLICATIONS BRANCH, DEPT. OF AGRICULTURE, VICTORIA, B.C.

VARIETY TESTING WORK

AT the present time some of the most important work that is being carried on in British Columbia under the provisions of THE AGRICULTURAL INSTRUCTION ACT is the co-operative variety testing work.

The variety testing work has been undertaken in the hope of obtaining some definite information as to what varieties of the different field crops are best suited to the various districts. Free seed samples are distributed by the Department of Agriculture to members of farmers' institutes recommended by the Institute president and secretary, or where there is no institute the samples are sent to farmers subject to the approval of the Department.

The success of this work and the value of the data secured will depend altogether on the care given the work by those co-operating.

The Soil and Crop Division has taken pains to secure the best seed obtainable and the rest remains with the individual farmers who are supplied with samples.

UNDERDRAINAGE

Provision has been made by the Department of Agriculture enabling the Soil and Crop Division to conduct demonstrations in underdrainage. For this purpose the Department has purchased a Cyclone ditcher, which will be operated in some parts of the Okanagan and West Kootenay districts during 1917.

The object of the Department in providing for this assistance is to demonstrate to the farmers of the above districts the value of underdrainage of the heavy clay areas, and those fields which are rapidly becoming less productive under irrigation due to seepage, alkali, etc., and also to determine, if possible, the cheapest method of removing the earth preparatory to laying drain tile.

Mr. W. A. McTaggart, Fruit Markets Commissioner, with headquarters at Calgary has resigned and has accepted a position with the Grain Growers' Guide of Winnipeg.

Mr. A. R. Neale, Assistant Horticulturist, Prince Rupert, has resigned and is taking charge of his father's ranch at Willow Point, Nelson, B.C.

PART III

Rural Science

HOUSEHOLD SCIENCE IN NORMAL SCHOOLS

Household Science, as a subject of study in the curriculum of colleges and schools is, comparatively speaking, of recent introduction. Its general adoption and recognized use, has, however, kept pace with the advance made in the teaching of agriculture. Normal Schools throughout Canada, as pointed out in the following series of articles, are now teaching this subject regularly to students qualifying for the teaching profession, who, in turn, carry it into the rural schools and thus serve to inculcate the principles governing the home, cookery, sewing, home nursing and allied subjects:

NEW BRUNSWICK

BY HEDLEY V. B. BRIDGES, M.A., LL.D., PRINCIPAL NORMAL SCHOOL, FREDERICTON

WE have not had any instruction given in household science in our normal school up to the present time. At the last meeting of our Board of Education which was held recently it was re-

solved to have household science taught to the students in the normal school. No definite programme has yet been laid down, as the work will not be taken up until the beginning of the next academic year.

ONTARIO

INSTRUCTION in household science given in the normal schools of Ontario is prescribed by the Department of Education and is the same for all of these schools in the province. The course includes the following topics:

Introductory: The scope of household science; its correlation with other subjects in the school course.

The House: Purpose; location; general ideas concerning use and furnishing of the rooms; methods of cleaning, including principles of laundering.

Foods: Elements of food required by the body; sources, food value, and digestion of these; analysis of common foods—milk, eggs, meat, fruit, vegetables, cereals; effect of heat on these, as to food value, digestibility, and flavour.

Cookery: Principles of combustion; con-

struction and care of stoves; fuels; principles and practice of each method of cooking—boiling, simmering, steaming, steeping, toasting, broiling, frying, baking; food combinations; flour mixtures; lightening agents used in these; table service.

Bacteriology: Occurrence and nature of bacteria; sanitation based on this knowledge (necessity for cleanliness, care of plumbing, disposal of waste, methods of disinfection); preservation of foods.

Home Nursing: The ideal sick-room (location, furnishing, ventilation, heating, care); care of the patient (bath, bed, clothing, and food).

Sewing: Study and application of different stitches, basting, running, stitching, back stitching, combination stitch, overcasting, top sewing, blanket, herring-bone, feather-stitching, mending, darning (different kinds), button holes, mitred and square corner, hemming, doll's apron. (Special attention is given to this subject).

OTTAWA NORMAL SCHOOL

THE course in household science given at the Ottawa normal school is that laid down for all normal schools in the province by the Department of Education. The cooking consists of lessons that the students can use with very little

equipment in having the children in rural schools provide something hot for their noon lunches. The sewing is a full course in elementary sewing to enable students to teach simple work in sewing in the rural schools.

STRATFORD NORMAL SCHOOL

BY S. SILCOX, PRINCIPAL

THE household science course as outlined in the syllabus is much broader than it is possible to carry out in the time allotted to the subject in the school year. The subject resolves itself, therefore, into two branches, cookery and sewing, and both are taken up from the standpoint of the needs of the rural school. Sewing receives the greatest emphasis because it can be introduced into any rural school with very little equipment. Sewing, then, takes up a little over half of the school year. First we try to give a grounding in stitch forms and their uses. These are taught by means of some useful garment—not by small samples of

cloth mounted in a book. After the students have acquired sufficient practical knowledge we begin our grade work, taking each form in turn from I to IV, discussing equipment, materials, subject matter and methods, and as many articles are made as time will permit, illustrating different stages and phases of the work. In cookery we have about ten or eleven lessons in the year. The practical and theoretical parts of each lesson should be suited as far as possible to the possibilities of the rural school or should suggest ways in which rural school lessons may be developed.

HAMILTON NORMAL SCHOOL

BY S. A. MORGAN, PRINCIPAL

ALTHOUGH the course in household science at the Hamilton normal school is not an excessive one, owing to the limited amount of time allotted to it, yet, since it offers a fairly wide variety of work, it enables the student to appreciate the scope of the subject, and to recognize ways and means by which she may strive to establish higher, yet simpler, standards of living in her school community.

The course includes a study of the house, its evolution, location and care; the study of its sanitary appointments and the underlying principles of simple house furnishing. The battle against bacteria and the

care of the sick are also given some attention, but the maximum amount of time is devoted to the study of foods and sewing.

One of the most vital problems of today is the food problem, and, therefore, instruction is given in the uses of food to the body and the intelligent selection of food, from an economic and physiological standpoint, to suit the specific requirements of the individual, with special attention to the student diet. Each of the common foods is studied and the principles evolved illustrated by the cooking of some simple dish.

For some time the Ontario Department of Education has aimed to prepare students for teaching the

subject in the rural schools, but girls trained in the regular food laboratory feel that they cannot teach without the orthodox equipment. A plan is in operation, therefore, for teaching household science in the rural school in connection with the school lunch, using a special equipment consisting of a three burner oil-stove and two portable tables with working space for four students. This, it is hoped, will obliterate the usual objections to the introduction of the subject—the over-crowded curriculum and the lack of space.

Because of the lower cost of installation, sewing is more easily introduced into the schools; hence special stress is placed on this phase of the work. Much of this time is devoted to discussions on incentives and materials suitable for teaching sewing in the lower forms. Small articles, easily and quickly finished and made of coarse canvas and bright-coloured yarns, which will neither tax the patience nor the

eyesight of the children, are constructed. These are followed by needle cases, bags, towels, table napkins and other articles of interest to girls in the higher forms. As soon as the pupils begin to make things of actual use, attention is called to the material handled, its name, its suitability and its cost, in order that they may not only know how to sew but how to plan, what to buy, and what not to buy. Representative samples of cotton, linen, silk, wool and lace are collected and mounted in a textile book, which also contains an essay on the production of each fabric, and a textile map showing the countries which produce or manufacture them. In this way the work is correlated with English, geography, industrial history and art and, at the same time, it tends to make the girls better and more economic consumers, and should give them new standards of the beauty and service of materials.

SASKATCHEWAN

HOUSEHOLD SCIENCE INSTRUCTION

BY MISS F. A. TWISS, DIRECTOR OF HOUSEHOLD SCIENCE, DEPARTMENT OF EDUCATION

THE teaching of household science in Saskatchewan began in the year 1909, when the public schools of Regina, under Superintendent E. B. Hutcherson, installed an equipment in Alexandra school. In less than four years, Moose Jaw, Saskatoon and Prince Albert had followed Regina. Prince Albert equipped one centre, which serves both public and high schools; Saskatoon equipped two; Moose Jaw three, and Regina six centres. In 1916 two collegiate institutes and one high school installed equipments for this work.

In the autumn of 1914, a Director of Household Science was appointed

as an official in the Department of Education. In January, 1915, the Director entered upon her duties, which include the supervision and direction of the work of the teachers-in-training in the normal schools, the inspection of the work in high schools, and the extension of household science to the schools in rural communities, so that it may be brought into close relation with life in the country. To accomplish this last, special attention should be given to the training of teachers. For this purpose two specialists were engaged in 1916 to give the necessary training in the two normal schools.

For the last two years household

science has been an optional subject for second and third class teacher's examinations. There were twenty candidates who chose this option in 1915. In 1916, there were seven times as many, which shows that girls especially feel the need of the knowledge, which this subject alone can give.

Of the seven cities in the province, household science is taught in the public schools of six of them; of the seven collegiate institutes it is taught in three; of the fifteen high schools it is taught in four. Some phase of household science is taught in about one-third of all the towns and village schools in the province.

SASKATOON NORMAL SCHOOL

BY MRS. E. B. RUTTER, INSTRUCTOR IN HOUSEHOLD SCIENCE, UNIVERSITY OF SASKATCHEWAN

THE Foods and Cookery Course one is given to candidates for second and first class teachers' licenses and consists of 16 lessons of two hours each. The course aims to emphasize:

1. The food needs of the growing child.
2. That nutrition is the basis of health—"After food, education."
3. That the teacher in the rural school should accept as her responsibility the intelligent direction and supervision of the noon lunch hour and should realize in so doing the wonderful opportunities of helping the child and so very materially in helping the home and the state.

Dishes particularly suitable for child feeding and such as might be used as the "hot dish" for the school lunch are chosen and prepared in the laboratory. Bread is included both because every young woman should be able to make and know good bread and also that she may be able to give valuable assistance to the children in their school fair work.

The full course includes 17 lessons, one being given on each of the following: beverages; fruits, fresh and dried; starchy and non-starchy vegetables; macaroni (rice) with tomato sauce and cheese; cream of vegetable soups; chowders; dried vegetables; cornstarch desserts; eggs; brown stew with rice border and diced buttered carrots; flour-mixtures, batters; flour mixtures, soft doughs; flour mixtures, bread; salads; sandwiches; lesson 17 consists of a written examination in foods and cookery.

FOODS AND COOKERY—COURSE II

This course was optional to the male teachers-in-training. One lesson a week for three months was the extent of this course. The following theoretical work was taken up:—

1. Classification of food-stuffs—functions of each class.
2. Food requirements of the body.
3. Practice in arranging balanced meals.
4. Dangers of mal-nutrition.

The laboratory work comprised the preparation and cooking of dishes selected from Course 1, and, in addition, the making and freezing of ices, and the stuffing, trussing and carving of fowl.

Table-setting and serving and table etiquette were also included in this course.

NEEDLEWORK

One hour a week for four months to candidates for second and first class teachers' licenses.

This course aims to teach the students the best methods of presenting and teaching sewing to children.

Work suited to the various grades is taken up and discussed, and as many models showing application of stitches are made as time will permit.

Instruction is given in the use of commercial patterns, textiles and trimming materials.

Each student cuts and makes by hand one simple undergarment.

HOUSEHOLD SCIENCE TO THIRD CLASS NORMAL-STUDENTS

Forty-minute periods twice a week for two months was the time allowed for this work. No laboratory work was given.

Instruction was given with a view to preparing a basis for later work.

The following phases of the work were taken up:—

1. Necessity of health preparedness.
2. Body functions—food functions.
3. Classes of foodstuffs and their uses to the body.
4. Value of cellulose in the diet.

5. Requirements of normal blood.
6. Organs of digestion—functions—secretions.
7. Nutrition—mal-nutrition.
8. Drill in meal planning.
9. The school lunch—its needs and how to meet them.

NEEDLEWORK

The value of sewing in the schools was discussed. The method of presenting the subject and the materials and stitches suitable for the age and grade of the child were outlined.

A stitch form on coarse cotton with silk was prepared by each student.

NORMAL SCHOOL, REGINA

BY MISS HELEN MCMURTRY, IN CHARGE OF HOUSEHOLD SCIENCE DEPARTMENT

OUR term for first and second class students is of four months' duration and in that time our aim is to give the students instruction that will be of most value to them in the teaching of public school children; also methods for the application of this work, particularly in rural schools. Our course includes sewing and textiles, home craft in the class room and the study

of food and its preparation, especially in relation to the noon lunch.

The work in sewing includes the stitch forms and their application on simple articles of use to the child in the class room, the care and repair of clothing and the study of textiles. In textile study the students give five minute talks on the history of manufacture, and they collect samples, which they mount. In class



FIG. 1. THE NOON LUNCHEON, MODEL SCHOOL CHILDREN, NORMAL SCHOOL, REGINA, SA

work the study of fibre and household tests for its identification are taken.

The study of food and its preparation includes:—

Food and its relation to the body;

Food value of our most widely used foods;

Food for children of school age;

The equipment, supplies and organization of the schoolroom for serving the 'hot dish'.

In the final lesson in the laboratory each class resolves itself into a rural school. Each student prepares a lunch box, the hot dish is prepared and all are served in a class room opposite the laboratory in a way which might be followed by each student in a country school.

In the lunch room (Fig. No. 1) about twenty-four of the model school children, who bring their lunches during the winter months, are served one hot dish each day. The normal school students are arranged in groups of four, each group taking charge of the lunch room for two days. The workers are arranged as follows:—one acts as manager and presents plan of preparation and account of the cost of the dish to the household science teacher; two cook the food; and a fourth, with the help of two model School children, sets and clears the

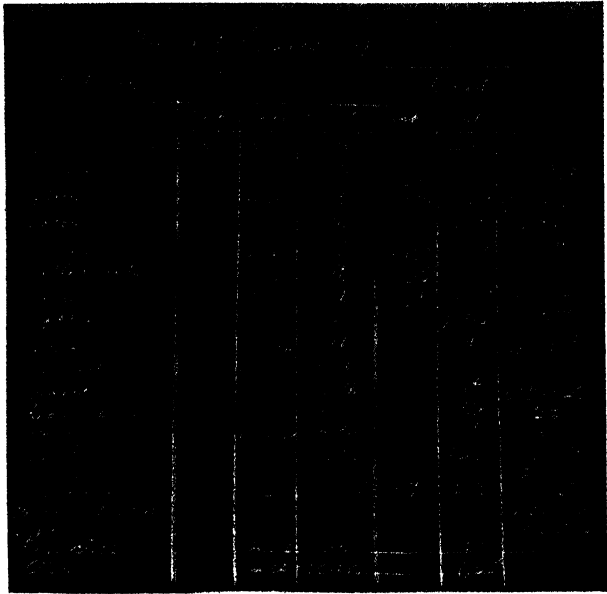


FIG. 2. TABLE SHOWING MARKET PRICES OF FOODS

ables. The cafeteria plan is followed in serving as it saves time. A blackboard in the lunch-room (Fig. No. 2) on which current prices of food are kept up-to-date by the students, furnishes the necessary data for keeping account of the cost of the food. The dishes include cocoa, baked apples, cream soups, macaroni and cheese; and cost, on an average, three cents *per capita*.

We have also a third class normal school extending over a period of ten weeks. The students in attendance are given demonstrations on suitable dishes for the noon-day lunch; and in sewing are instructed in the stitch forms.

ALBERTA

PROVINCIAL NORMAL SCHOOL, CALGARY

BY E. W. COFFIN, PRINCIPAL

THE normal training courses in the provincial normal school, Calgary, are at present only four months in length and the amount of time given to household science under these circumstances is 90 min-

utes per week to cooking and 40 minutes per week to sewing, the course extending over sixteen weeks.

The Department of Household Science was established in the Calgary normal school in January, 1913.

During the school term, which extends over four months, two hours a week are given to the study of household science. This time is divided into two periods, one for needlework and one for foods and cooking.

The special object of the in course needlework is to enable teachers to undertake the sewing prescribed for the grades in the public schools. The course includes the following topics with methods of class procedure:—Plain stitches and simple decorative stitches taught and applied in the making of small articles of interest to young children, hems, seams, mending, gathering, and stroking; putting on bands, making

button holes, sewing on buttons, textiles.

The special object of the course in cooking and foods is to create an interest in the study of foods and nutrition and to prepare teachers to give some instruction to pupils in the village and rural schools. The course includes the following topics: principles and practice of methods of cooking; analysis of common foods, milk, meat, eggs, fruits, vegetables, cereals, flour mixtures and leavening agents; table setting and serving; the school lunch.

The girls from the practice school connected with the normal school receive instruction in this department.

NORMAL SCHOOL, CAMROSE

BY MARGARET A. STEWART, INSTRUCTOR IN HOUSEHOLD ARTS

THE work in household art, as taught in the normal schools of Alberta, covers a period of sixteen weeks—three and three-quarter hours weekly.

The courses include lectures and demonstrations or laboratory work. They are grouped under the following topics:—

HOUSEHOLD SCIENCE

1. Cooking—theory and practice, study of common food materials.

Methods of cooking simple breakfast, luncheon and supper dishes.

2. Table Service.

3. School lunches—as applied to rural schools.

HOUSEHOLD ART

1. Study of the common textiles. Use of tools, materials, etc.

2. Common stitches as applied to useful articles.

3. Knitting, crocheting, simple embroidery.

4. Machine sewing—simply constructed articles.

5. Methods of teaching.

ECONOMICS OF THE HOUSEHOLD

1. Theory of food.

2. Nutrition and diet.

3. Chemistry of digestion.

4. Food values—economic, psychological and caloric calculations.

5. Balanced luncheons and meals.

6. Home nursing—accidents, treatment of.

7. Sanitation and business of the home.

These courses while giving in a general way more intelligent knowledge of the three fundamental factors of existence—food, clothing and shelter—are especially designed for teachers who are to teach in rural and village schools. A special feature is made of the rural school lunch problem. While the subject of the noon lunch is discussed from many angles so as to include both urban and rural conditions, the pupil who is too far from home to admit of his returning at noon is the one constantly in mind. It is distinctly the opinion of this department that the school should share with the home the responsibility of the mid-day meal. The task for the school would vary in different localities but there is a growing tendency to try the experiment of preparing part of the meal at school and of allowing time for serving it carefully. If handled rightly, the meal, even under the usual difficulties presented in the rural school, may offer most favourable opportunities for social training, for eating is a social as well as a physiological process. It would also

promote the general health and efficiency of the pupils and teacher as well as inculcate habits of cleanliness, sanitation and simple cookery. The situation, however, requires a teacher of ingenuity and enthusiasm for her work.

The three main difficulties in the way of accomplishing this work in the rural school of one room are:—

1. Lack of special training in household science on the part of the teacher.
2. Lack of space and equipment as is generally thought necessary in the preparation of food at least.
3. Lack of time in an already crowded curriculum.

The first difficulty is being solved by the Department of Education providing special instruction in the normal schools and in the summer school for teachers at the University of Alberta. The second problem will be solved in the main by the teachers and pupils if they are thoroughly in earnest. The third obstacle rests with the teacher to so adjust and correlate her work as to make this part of her programme worth while.

In the training course given at the normal schools to both men and women students, the lunch problem is discussed under the following heads:—

1. Desirability of properly prepared and selected lunches. Menus.
2. Ways and means of securing equipment and materials. Methods of interesting parents and school boards.
3. The supplementary dish prepared at school—suitable dishes, methods of organizing the work, recipes and combinations of ingredients.
4. Methods of sewing—cleaning away.
5. The social effect of an orderly meal at school.

The practical work in connection with this discussion is the making of certain types of dishes suitable for the season—as in winter, usually a hot dish is served; in summer, cold, as a salad.

The following class of foods may be prepared using the ordinary school heater. If the products of the school

garden are utilized, the dishes are of little expense:—

1. Cream of vegetable soup.
2. Creamed vegetables, fish, meat, eggs, cheese.
3. Stews, chowders.
4. Fruit and simple milk desserts.
5. Salads.
6. Beverages—cocoa, chocolate, fruit drinks, milk.

The equipment should be simple, using as few utensils as possible:—

- 1 large kettle of granite holding 8-10 qts., 1 small saucepan—granite, 1 mixing spoon, 1 measuring cup, 1 tablespoon, 1 paring knife, 1 ladle and sieve, 1 dish pan, 1 tray, towels, 1 teaspoon, 1 can opener.

A table, covered with white oil cloth and a two burner oil stove, with or without an oven, would be found useful if the occasion warrants such. This of course would increase expense. The children will, as a rule, be found willing to bring plates, cups, bowls and spoons from home. The boys could make shelves and the girls a curtain to hang in front and keep out the dust. A home-made fireless cooker would also be found convenient for the cooking of meat stews and bean soups, and many other dishes which require long cooking.

The general plan of work as discussed with the normal students is as follows:—

The school chooses committees whose duties it is to collect materials, prepare and serve the dish which is to supplement the lunch brought from home. The teacher usually demonstrates the new lesson about one-half hour before noon, the committee assisting. At twelve o'clock the pupils wash their hands, get their lunches and return to their seats. The hot dish is then passed and the meal eaten in an orderly and controlled manner. The gathering together and having one common interest where co-operation is needed fosters a better community spirit, and gives the pupils a broader conception of service and social responsibility, thus laying foundations of higher ideals of democracy.

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

AGRICULTURAL LEGISLATION

FEDERAL AND PROVINCIAL ACTS FOR THE SUPPRESSION AND CONTROL OF INSECTS, PESTS AND DISEASES INJURIOUS TO, OR DESTRUCTIVE OF, VEGETATION

The danger of the introduction of injurious insects, pests and plant diseases is probably greater in Canada than in any other country. This is due to the fact that, owing to the rapid development and opening up of the country, a large amount of vegetation of all kinds, such as trees, shrubs, plants, seedlings, etc., is imported into Canada from countries in various parts of the world. All this vegetation, collectively termed "Nursery Stock," is liable to be infested with insects and other pests and diseases which do not occur in Canada. Introduced in this manner, however, they become established in many instances, and the serious effects of the establishment of introduced insects in a new country are enormously increased by the fact that their chief means of control in the countries to which they are native, namely, their natural parasites and other enemies, are not usually brought with them into new country. In the absence of such natural checks their tendency is to increase abnormally, as many introduced pests are now increasing in the United States and Canada.

The foregoing is from Bulletin No. 12, second series, Division of Entomology, giving a full statement of legislation in Canada up to 1912 to prevent the introduction and spread of insects, pests and diseases destructive to vegetation, with regulations regarding the importation of vegetation into Canada, by Dr. C. Gordon Hewitt, Dominion Entomologist, who in another statement elsewhere estimates that insect pests cause the destruction each year of crops in Canada to the value of over \$125,000,000, to which has to be added the amount of damage caused by plant diseases, also totalling in value many millions of dollars. In the same bulletin Dr. Hewitt tells of the coming of the San José Scale, leading to the passage by the Dominion of the San José Scale Act in 1898. This Act, which prohibited the importation of nursery stock from countries in which the scale occurred, was superseded in 1901 by an order in council allowing such nursery stock to enter during certain periods of the year at certain ports when fumigated with hydrocyanic acid gas, several classes of nursery stock, such as

herbaceous plants, etc., being exempt from fumigation. In 1909 winter webs of the Brown-tail moth were found in shipments of nursery stock from France and this led to the passing by the Dominion in 1910 of The Destructive Insect and Pest Act, under which regulations could be made providing for the prohibition of entry, fumigation on entry, or inspection subsequent to entry, of nursery stock, or defining other conditions under which such stock might be introduced into Canada. Regulations have been passed by orders in council from time to time in accordance with the provisions of Section 3 of this Act.

Before passing to consideration of the Acts themselves it should be stated that in addition to the aforementioned Act of the Parliament of the Dominion, the legislatures of all the provinces, excepting Manitoba, Saskatchewan and Alberta, which depend mainly upon the provisions of the Dominion Act, have passed measures having the same object in view, namely the suppression and control of insect pests and plant diseases within the jurisdiction of the different Departments of Agriculture.

THE DOMINION DESTRUCTIVE INSECT AND PEST ACT

The Dominion Act repeals the San José Scale Act and provides that the Governor-in-Council may make such regulations as are deemed expedient to prevent the introduction or admission into Canada, or the spreading therein, of any insect, pest or disease destructive to vegetation. The Act then defines the scope of regulations that may be adopted to check or prevent the entry of plants infested with insects or infected by disease and for the manner of treatment of such plants; for the destruction of any crop, tree, bush, or other vegetation or vegetable matter so affected, and for compensation for the same, not to exceed two thirds of the value of the matter so destroyed; for prevention of the sale of any such matter; for notification of the Minister of Agriculture by the occupier of the premises on which such infected plants are discovered and for the forwarding of specimens of insect, pest or disease; for confiscation of such matter and generally for any other purpose which may be deemed expedient for the enforcement of the provisions of the Act. The Minister is authorized to appoint inspectors and other officers for carrying out this Act and the regulations made thereunder. Any inspector or other officer so appointed may enter any premises for the purpose of fulfilment of the provisions of the Act, in which he has reason to believe there exists any infected matter. The Minister of Agriculture, if the report of the inspector warrants action, can prohibit the removal or movement of any vegetation, vegetable or other matter, which, in his opinion, might result in the spread of insect, pest or disease. Persons contravening any provisions of the Act are liable to a fine not exceeding one hundred dollars, or imprisonment for a term not exceeding six months, or both fine and imprisonment, and to have the vegetation confiscated.

The regulations adopted under the Act up to date number 18. They define the ports of entry and fumigation, the periods open to entry, the countries and states from which importations must be inspected, and the vegetation and florist stock that is exempt from limitation of port and period. Persons intending importation of nursery stock, except such as is exempt from fumigation requirements, must give notice to the Dominion Entomologist at Ottawa of such intention, with particulars, within five days of dispatching the order for the same. The duty of inspectors is minutely defined. A list of destructive insects, pests and diseases to which the Act applies is given. The importation of potatoes from Europe, Newfoundland and the Island of St. Pierre or Miquelon is prohibited. The importation of both chestnut (*Castanea dentata*) and chinquapin (*Castanea*

pumila) from the United States is prohibited. The importation of all non-canned fruits, plants or portions of plants, or other vegetation, from the Hawaiian Islands is prohibited. Forest plant products from Maine, Massachusetts, New Hampshire, Connecticut and Rhode Island must be accompanied by certificates showing that they have been inspected by the United States Department of Agriculture and found free from the Gipsy moth. The importation is prohibited from the same states of coniferous trees, such as spruce, fir, hemlock, pine, juniper (cedar), arbor-vitæ (white cedar), or foliage thereof, and decorative plants, such as holly and laurel. The importations of all nursery stock, including trees, shrubs, plants, vines, grapes, scions, cuttings or buds, through the mail is prohibited, excepting greenhouse-grown florists' stock, cut flowers, herbaceous perennials and bedding plants, which are admitted, providing a detailed statement of the contents is attached to such parcels. The Minister of Agriculture may, upon request to that effect, authorize the importation into Canada of any vegetable or plant insect pest or disease for scientific purposes only.

PROVINCIAL LEGISLATION

The legislation adopted by the provinces is mostly of an interprovincial or locally provincial character. Prince Edward Island has an Act that was passed in 1883 intended to prevent the depredations of the potato bug, and another Act, passed in 1895, to prevent the spread of the black knot on plum and cherry trees. Both of these Acts require the appointment of inspectors by Boards of School Trustees to see that their provisions are carried out.

In Nova Scotia The Injurious Insect Pest and Plant Disease Act was passed in 1911. Under it the provincial Department of Agriculture is authorized to appoint inspectors, to meet the expenses of inspection and fumigation, and to take such steps as may be necessary to eradicate insect pests and to prevent their introduction and spread. The Act has proved efficient in several instances in preventing the importation of disease from other provinces, notably in the case of nursery stock brought from Ontario in 1912 that was found infested with San José Scale. In many respects the Nova Scotia Act is a confirmation and amplification of the Dominion Act. The same is also true of this special class of legislation adopted by the other provinces. Persons contravening the Act are liable to a fine of not less than \$20, nor more than \$100, with costs, and, in default of payment, to imprisonment for not less than ten days or more than thirty days. Regulations may be made at any time by the Lieutenant-Governor-in-Council. One of these regulations provides that

no imported nursery stock shall be delivered within the province of Nova Scotia unless accompanied by a certificate from the Provincial Entomologist or other authorized Government officer approved by the Secretary of Agriculture. The certificate must be attached to each parcel or bundle, or in the case of a carload to the car itself. Persons importing stock must notify the Provincial Entomologist within five days of giving the order and common carriers or express companies must notify the same authority immediately on receipt of any nursery stock brought into the province. Destruction is ordered in the presence of an inspector of all infected stock. Provision is made for the fumigation and inspection of stock coming from other parts of Canada only.

In the New Brunswick Injurious Insect and Pest Act, passed in 1913, founded largely on the Dominion Act, provision is made as in other provincial measures for the Lieutenant-Governor-in-Council to make such regulations as are deemed expedient to prevent introduction into the province, or the dissemination therein, of any insect, pest or plant disease, seriously injurious to vegetation. The occupier of the premises on which insect or disease appears is required to notify the provincial Minister of Agriculture, at the same time forwarding specimens. The penalty for contravention of the Act is the same as in Nova Scotia. The Lieutenant-Governor, by order in Council, may direct the inclusion in the provisions of this Act of any insect, pest or plant disease seriously injurious to vegetation. Orders in Council have to appear in two consecutive issues of the provincial *Gazette*. Other provisions are similar to those in the Dominion Act.

THE QUEBEC ACT

"An Act respecting the Protection of Plants from Destructive Insects and Fungoid Diseases" was adopted by the Quebec legislature in 1914. It is forbidden, except under the authorization of the Minister, for scientific purposes, to import into the province any plant or part of a plant attacked by the San José Scale, the Brown-tail moth, the Gypsy moth, the Woolly Aphis, Black Knot, Apple Canker or Potato Canker. Upon the production of a document stating his official capacity, the Entomologist of the provincial Department of Agriculture, or his assistant or representative, has the right to enter any nursery, orchard or other premises wherein there is reason to believe that there are plants of any kind. No one must have in possession or offer for sale or gift any infected plants. The owner or occupant of any land where insects or diseases of the kind specified exist, or are suspected of existence, must immediately inform the Minister. The provincial Entomologist or

his assistant is required to give instruction for treatment or destruction of infected plants and no vegetation can be removed until such order has been complied with and a certificate has been given to that effect. Section 2041k of the Act reads "No compensation for expenses incurred or damages suffered through the treatment or destruction of any plants, trees or other vegetable matter attacked by any of the destructive insects or plant diseases specified, or for any damages which may arise from the enforcement of this section, shall be allowed by any court when such treatment, destruction, expenses or damages result from the instructions given by the Entomologist or his assistant or representative acting in their official capacity."

Between the 15th of June and the 15th of September in each year the provincial Entomologist or his assistant or representative, is required to visit every nursery in the province in which plants are grown for commercial purposes, and to give a certificate of soundness if such is warranted, such certificate to stand good until the next annual inspection. No owner or person in charge of a nursery in the province can sell, give or deliver, any plant or vegetable matter without being in possession of such certificate. Contraveners of the provisions of the Act are liable to a fine not exceeding \$100 with costs.

THE ONTARIO FRUIT PEST ACT

Relative to the legislation that has been adopted in Ontario better cannot be done than to quote the following from the aforementioned bulletin prepared by the Dominion Entomologist:

"The Province of Ontario has a legislative measure known as The Fruit Pest Act (10 Edw. VII, c. 99, 5.1), which is administered by the Fruit Branch of the Department of Agriculture. Insects and plant diseases affecting fruit trees only are scheduled under this Act. These are: the Codling Moth, San José Scale, Pear Psylla, Black Knot, Little Peach, Yellows and Pear Blight. The regulations are intra-provincial in scope, and the work is carried on chiefly in conjunction with the municipalities which appoint inspectors subject to the approval of the Minister of Agriculture, in addition to those appointed by the Provincial Department of Agriculture. These inspectors have power to order the destruction of infected or diseased trees and plants. Owners of nurseries are not allowed to dispose of any plants unless they have been fumigated in accordance with the regulations prescribed by order of the Lieutenant-Governor-in-Council. Inspectors visit the nurseries to see that the fumigation regulations are properly carried out and to destroy infested trees."

Every person owning, leasing or managing any orchard or collection of plants,

other than a nursery, must, on any plant to his knowledge becoming diseased, destroy such plant by fire or effectually treat the disease by fumigation or spraying with such material as may be prescribed by the Minister. The council of any local municipality may, and upon the petition of twenty-five or more rate-paying fruit growers must, pass a by-law appointing at least one inspector to enforce the Act and fixing the remuneration, fees or charges he shall receive. The by-law must be approved by the Minister and will only hold good for a year. The inspector on finding disease, must notify the owner or occupant to have the affected plants sprayed or destroyed as the inspector may think advisable. The owner or occupant not complying within ten days, the inspector may himself cause the work to be done, the cost being imposed as a special tax upon the lot. The municipal inspectors are subordinate to the Provincial Inspector appointed by the Minister. The council has to pay the remuneration, fees and charges of the inspector, and is entitled to receive one-half of the expenses so incurred on furnishing a statement certified to by the Provincial Inspector before the 15th of December of the year to which it applies. No proprietor or manager of a nursery can send out or permit any plant to be removed until the same has been fumigated by hydrocyanic gas in accordance with the provincial regulations. Nothing can be sent out from the nurseries that has contained diseased plants until notification is received from the Minister. The other provisions of the Act, such as notification of the disease to the Minister and inspection and examination, correspond with the provisions of other provincial Acts previously mentioned. Penalties for contravention are fines of not less than \$10, nor more than \$100, recoverable under the Ontario Summary Convictions Act. The Lieutenant-Governor-in-Council can include in the Act other diseases that may be revealed, notice of the same being published in two successive issues of the provincial *Gazette*. The Lieutenant-Governor-in-Council can also make such regulations as may be deemed expedient to give effect to the Act. The regulations already passed define in particular the manner and method of fumigation.

BRITISH COLUMBIA LEGISLATION

British Columbia has delegated to the Provincial Board of Horticulture, established in 1892, the power to pass regulations for the purpose of preventing the spread of injurious insects or plant diseases. The Act establishing the Board was consolidated in 1911 with other provincial Acts of an agricultural character under The Agricultural Associations Act, of which sections 54 to 57 relate to the prevention of the introduction and spread of insect pests and plant diseases. Section 55 of The Agricultural Associations Act defines the duties of the Board, which are to make regulations, under approval of the Lieutenant-Governor-in-Council, for the suppression of insect pests and plant diseases, and to see that owners and occupants govern themselves in accordance with such regulations. These regulations have to be circulated by the Board in printed form among the fruit-growers and fruit dealers of the province and published in the *British Columbia Gazette*. If the Board think well the regulations can also be advertised in papers of general circulation and must be posted in three conspicuous places in each district, one of which must be the local court house. With the approval of the Lieutenant-Governor-in-Council places and quarantine stations may be established for the purposes of inspection, the penalties for infraction of the regulations being fixed in like manner. The Lieutenant-Governor-in-Council is required to appoint from the Board, or from without, a competent person to be known as "Inspector of Fruit Pests." Any member of the Board, or the Board's inspector or agent, can cause inspection to be made where there appears to be reason for the same and has full power and authority to enter any farm, orchard, nursery or garden, barn, warehouse, storehouse, shop or other place or building, and, if disease is found, the owner or occupant is to be notified in writing and ordered to destroy such infected products and to disinfect the premises. If the owner or occupant fail to obey the order, then the representative of the Board is to take the matter in hand. The members of the Horticultural Board are called upon to serve without remuneration, receiving only their travelling expenses. The regulations contain a list of forty insect pests or plant diseases to be guarded against.

SOCIETIES AND ASSOCIATIONS

The Canadian Council of Agriculture, in session at Regina, Sask., March 13, 14 and 15, elected H. W. Wood, of Calgary, president; J. A. Maharg, of Moose Jaw, vice-president, and Roderick Mackenzie, of Winnipeg, secretary-treasurer.

The Canadian Society for the Protection of Birds has carried out a spring programme of educational meetings in the city of

Toronto. Five meetings were held in March and three in April. The subjects of the March meetings were: The Protection of Birds, The Migration of Birds, The Structure of a Bird, The Bird in Literature, Common birds of the Roadside and From Birds to Reptiles. The subjects of the April meetings were: Birds of Toronto, How to Study Birds, and Insects and Birds. Lantern slides were used at a number of the meetings. The secretary of the association is Laura B. Durand, Toronto.

THE WEST DURHAM HORSE BREEDERS' CLUB

The West Durham Horse Breeders' Club was organized recently at Orono, Ont., for the purpose of taking advantage of the offer of the Dominion Department of Agriculture to pay 40 per cent of the service fees for stallions, utilized in accordance with the regulations laid down by the Department. The District Representative for the county of Durham, R. S. Duncan, B.S.A., was responsible for calling the meeting and perfecting the organization. Mr. Wm. Smith, M.P., President of the

Ontario Horse Breeders' Association, delivered an address on the horse industry in general, and pointed out the value of the policy adopted by the Dominion Department of Agriculture in regard to improved horse breeding. The officers of this club, which is the first of its kind to be organized in Ontario, are: President, I. T. Chapman; vice-president, John Baker; directors, Arthur Wilsh, Norman Allen, Thos Cowan and Robert Martin; secretary, A. Henry.

THE BRITISH COLUMBIA GOAT BREEDERS' ASSOCIATION

At a meeting of breeders held at Vancouver, B.C., on Feb. 3rd, an association was formed as to be known as the British Columbia Goat Breeders' Association, with the following officers: president, S. H. Hopkins, Victoria; vice-president,

D. Mowat, McKay; secretary treasurer, George Pilmer, Victoria; directors, Arthur Crowe, Victoria; G. H. S. Cowell, Port Alberni; R. Heddle, Nelson; N. F. Tunbridge, Penticton. A census of the number of goats in the province is being taken.

STANDARDS FOR FRUIT PACKAGES

The British Columbia Fruit Growers' Association some time ago appointed a committee to work out a series of standards for packages for the various classes of fruit grown in the province. At the annual meeting of the association held at Victoria in February this committee presented their report which was adopted by the association as follows:—

"Apples.—That the convention favours the adoption of the box 18 x 10½ x 11½ as the standard apple-box of Canada; provided, however, that for export to a country which has a legal requirement regarding size of box, such legal requirement may be met by the shipper, as recommended by the 1914 Dominion Fruit Conference.

"We also recommend the adoption of a standard crate for apples, to contain the equivalent, by weight, of a standard apple-box.

"Pears.—The pear-box to be 18 x 8 x 11 inches.

"Crab-apples.—The pear-box to be the standard for crab-apples.

"Peaches.—18 x 11 x 4 inches and 18 x 11 x 4½ inches (two depths).

"Prunes.—18 x 11 x 3¾ inches.

"Plums and Apricots.—The 4-basket crate: the standard dimensions of the baskets to be 7½ x 7½ inches at the top, 6½ x 6½ inches at the bottom, and 3¾ inches deep; and the 3¾ inch prune-box.

"Tomatoes.—The 4-basket crate and the 4½-inch peach-box.

"Cherry Lug.—5½ x 14 x 18 inches.

"Raspberries and Blackberries.—The 2-5 quart hallock.

"Strawberries and other Berries, etc.—The deep pint hallock.

"The Pear Lug-box and the Cantaloupe

Flat.—Sizes to be recommended by the committee to the executive.

"Cantaloupe Crate.— $11\frac{1}{2} \times 11\frac{1}{2} \times 20\frac{1}{2}$ inches.

"All dimensions are inside measurements.

"Resolved, That the various packages specified in this report be the standard sizes

for those various packages. The packages are interchangeable for the various fruits; provided, however, that only 2-5 quart hallocks shall be used for raspberries and strawberries.

"Resolved, That all fruit imported into Canada should comply with our standard sizes of fruit-packages."

EASTERN CANADA LIVE STOCK UNION

THE Eastern Canada Live Stock Union was formed in Toronto on April 18th. The organization was effected at a meeting called by the executive of the Ontario Horse Breeders' Association as the result of a resolution passed by that body at their annual meeting held in February. There were present representatives of a number of record and Ontario live stock associations including Clydesdale, Shire, Standard Bred, Hackney, Percheron, Shorthorn, Hereford, Aberdeen-Angus, Galloway, Jersey, Sheep and Swine Record Associations, also the Holstein-Friesian Association of Canada, North-American Galloway Association, Ontario Cattle Breeders', Horse Breeders', Sheep Breeders', and Swine Breeders' Associations, as well as the National Live Stock Records. Mr. William Smith, M.P., presided at the meeting and Mr. R. W. Wade, Secretary of the Ontario Horse Breeders' Association, was secretary.

The purpose of the organization is to

undertake work in Eastern Canada corresponding with that of the Western Canada Live Stock Union, which deals with problems of transportation, marketing, and other large questions relating to the welfare of the live stock industry. The Eastern Canada Live Stock Union is to include representatives of all record associations in Canada and all live stock associations in Ontario, Quebec, and the Maritime Provinces that care to affiliate. A provisional executive was formed consisting of the delegates present at the organization meeting and delegates duly appointed by other associations not represented. The following officers were elected: President, Wm. Smith, M.P., Columbus, Ont.; first vice-president, John Gardhouse, Weston, Ont.; second vice-president, R. R. Ness, Howick, Que.; secretary, R. W. Wade, Toronto. A small committee was appointed to draft a constitution to be placed before the association at a meeting to be called at an early date by the president.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS.

Report of the Director of the Dominion Experimental Farms. Besides the report of Mr. J. H. Grisdale, the Director, there is here given summary reports from the Divisions at the Central Farm and the branch Experimental Farms and Stations, all for the year ending March 31st, 1916. The year 1915 was the most abundant in the matter of grain-growing that Canada has ever known. In this report of upwards of one hundred pages, with appropriate illustrations and valuable statistical tables, will be found full details relative to the products of that wonderful year, the average price per bushel, the average yield per acre, the total production, compared with the previous year, and so on, not only in the country at large but in sections thereof. Statistics regarding the live stock covering five years are also given. Notes

are made of the new experimental stations established, followed by very complete tables of the meteorological records taken at Ottawa. An especially interesting feature is a report on the results of flax investigation, covering not only Canada but also the United States. Particulars of the work performed, the publications issued, changes in the staff, consequent mainly upon enlistments, a list of 103 of which is furnished, take up several pages. Then come the summaries previously spoken of, of the work of the Divisions at the Central Farm and of the branch farms and stations.

Special Circulars.—With a view of aiding in the increase of production and the betterment of farming, under the direction of the Director, Mr. J. H. Grisdale, B. Agr., a series of special circulars has been issued for general distribution containing instruction and advice on practically every line and branch of agriculture. The first of these by the Director himself is on *"Growing Grain on the Prairies."* It

affords counsel on winter work, on seed germination, on treatment for smut, on soil preparation for grain and flax, on quantities of seed to sow, on preparation for the following year, on summer-fallowing methods, closing with pointers on the rates of seeding to the acre, the depth to sow seed and packing. Circular No. 2 is by W. L. Graham, B.S.A., Assistant Field Husbandman, and has for its subject "*Maximum Crops for 1917*". It deals with the power employed on the farm, implements, the treatment of seed, seeding for the best results, hoed crops, corn for ensilage, care of meadows, and crop rotations. Circular No. 3 is by W. Saxby Blair, Superintendent of the Experimental Station at Kentville, N.S., and comes under the heading "*Varieties of Grain Recommended for Use in Canada*". Advice is given, with the endorsement of the Dominion Cerealists, of the varieties of grains most suitable for each of the different provinces. No. 4, by the same author, contains "*Notes on the Cultivation of Some Staple Vegetables*". No. 5, on "*Preparing Farm Horses for Summer Work*," is by E. S. Archibald, B.S.A., Dominion Animal Husbandman. After counsel as to the best method of getting the most work out of the horse, this circular treats specifically of feeding in preparation for hard work, watering the horse, changes in feeds, clipping and grooming, harness and shoulders, caring for the teeth, caring for the feet, and parasites which afflict the horse. In Circular No. 6, under the caption "*Produce More Poultry Products*," Messrs. F. C. Elford, Dominion Poultry Husbandman, and George Robertson, Assistant, tell how this can best be done. They point out the market that is open and urge increase of exports. They give sage advice in detail on mating and breeding, incubating and brooding, feeding, etc. No. 7, like No. 5, is by Mr. E. S. Archibald. It deals with "*The Dairy Cow*," specializing on feeding at various ages in varying conditions. In No. 8, Mr. G. B. Rothwell, B.S.A., Assistant Animal Husbandman, gives practical advice on "*The Feeding of Swine*." Mr. F. S. Browne, B.S.A., Assistant Agrostologist, in No. 9, recommends "*Varieties of Field Roots*" and in No. 10, Mr. W. L. Graham, author of No. 2, deals with the cultivation of "*Field Beans in Canada*."

THE POULTRY DIVISION

The Principles of Poultry House Construction, with general and detailed plans, by F. C. Elford, Dominion Poultry Husbandman; Bulletin No. 87. There is probably no branch of food production that is commanding wider and more miscellaneous attention than that of poultry keeping. It is a pursuit that any householder with a sufficiently large back-yard, in a district not circumscribed by city regulations, can

take active interest in. To such as these as well as to the breeder on a larger scale Mr. Elford's bulletin should appear especially attractive. It comprises 55 pages and upwards of 70 illustrations, diagrams and outline drawings of buildings and parts thereof. It constitutes a thorough exposition of the science of poultry housing founded on actual and long experience under conditions especially favourable. As the Director of the Dominion Experimental Farms in his introductory letter to the Honourable the Minister of Agriculture, puts it: "The bulletin, based on trials of various kinds of poultry houses in all parts of Canada, treats of this subject clearly and comprehensively, and plans and building instructions are so given as to enable anyone to erect the style of poultry house desired." The bulletin really goes further and combines with the constructive features a practical treatise on the methods of housing fowl so that they may be the most productive.

THE DIVISION OF HORTICULTURE

Garden Making on Vacant Lots and The Home Vegetable Garden is a timely brochure from the pen of Mr. W. T. Macoun, Dominion Horticulturist. It consists of 16 pages and, after referring to the duty of the home in the production of vegetables for food, proceeds to narrate what is being done in Toronto, Ottawa, Regina and Calgary in the cultivation of vacant lots and the organization of garden clubs. There is then set out methods for utilization of vacant lands and the way in which Boy Scouts can help. Instructions follow for the cultivation and arrangement of the home vegetable garden with lists of the best vegetables to grow and the requirements. Insecticides and fungicides are dealt with and instructions given as to methods of control. The pamphlet, which at this juncture should be in universal demand, concludes with full information regarding the growth of potatoes for both home use and the market.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC

Report of the Horticulture Service, 1916. This report of 36 pages is the first annual report of the Horticulture Branch, which during the year 1915-16 was substituted for the Arboriculture Branch. In addition to the report of Mr. J. H. Lavoie, Chief of the Horticulture Branch, there is included the report of the Director of Fruit Stations, of which there were 29 in operation during 1916; the report of the Chief Arboriculturist, who supervised the work of the Berthierville nursery and a number of demonstration orchards, fruit tree testing

stations and fields; the report of the Superintendent of Demonstration Orchards; and the reports of the Superintendent of School Gardens and of the Inspector-Entomologist.

ONTARIO

Peach Growing in Ontario by F. M. Clement, B.S.A., formerly Director of the Horticultural Experimental Station at Vineland, and A. G. Harris, B.S.A., Pomologist at the Vineland Station, constitutes Bulletin No. 241, of the Ontario Department of Agriculture.

This bulletin of 51 pages is suitably illustrated and gives complete information relative to the culture, shipping, diseases and insects of the peach crop. The more important insects and diseases attacking peach trees receive particular treatment at the hands of Professors L. Caesar and J. E. Howitt of the Department of Botany, Ontario Agricultural College.

Egg Production in Cities, Towns and Villages, by W. R. Graham, B.S.A., Professor of Poultry Husbandry at the Ontario Agricultural College, and *A Vegetable Garden for Every Home*, by S. C. Johnson, Vegetable Specialist, are Circulars Nos. 2 and 3, issued by the Ontario Department of Agriculture for public consumption. Each is accompanied by diagrams and conveys material information in plain form for the amateur in poultry keeping and in gardening.

Report of the Monteith Demonstration Farm, 1916. It is interesting to note that this report speaks of 1916 as the banner year for the Clay Belt section of New Ontario. Not the least interesting part of this comprehensive chronicle of the operations and activities of the farm are the illustrations which appear on nearly every page. Bette evidence of the possibilities and fertility of the region could not be given than is supplied by pictures of a field of O. A. C. No. 3 oats that yielded 60 bushels to the acre, of a clover seed field one month before cutting more than the height of the seat of a kitchen chair, of abundant turnip, potato and alfalfa fields, of well-furnished live stock, of promising soil and flourishing plants; as well as of miscellaneous vegetables, fruit and flowers that also evidently cut figures in the district.

Nature Study or Stories in Agriculture, by members of the staff of the Ontario Agricultural College; Bulletin 245, being a revised edition of No. 124. We have here an instructive bulletin of 70 pages, made up as the title implies, of stories of matters bearing on the many branches of agriculture, and starting with one by the president of the college conveying information in

the form of conversation from a twelve-year-old boy to his father. As a proof of the contents of this very valuable, and interesting and entertaining publication, it might be mentioned that there are the story of a grain of wheat by Dr. C. A. Zavitz, of a loaf of bread by Professor Robert Harcourt, of a quart of milk and a pound of cheese by Professor H. H. Dean, of an egg by Professor W. R. Graham, of raindrops by Professor W. H. Day, of the plane by Professor John Evans, of a bumble bee by Professor C. J. S. Bethune, of wool by Professor G. E. Day, of a horse by J. Hugo Reed, V.S., of apple scab by Professor J. E. Howitt, of the smallest living things by Professor D. H. Jones, of the plough by J. R. Spry, B.S.A., about honey by Provincial Apiarist Morley Pettit, of a day by G. H. Unwin, B.S.A., of a wormy apple by H. S. Fry, B.S.A., and of games to play, by A. Maclaren, B.S.A.

Suggestions on Feeding Stock by G. E. Day, B.S.A., Professor of Animal Husbandry, Ontario Agricultural College, Guelph, and "*The Live Stock Situation from the Marketing Standpoint*," by H. S. Arkell, Assistant Live Stock Commissioner, Live Stock Branch, Dominion Department of Agriculture, is bulletin 246 of the Ontario Department of Agriculture. Professor Day points out the importance of live stock and states that live stock will continue to be as it has always been in the past, the most important factor in successful farming." Dealing with the question of feeding, the composition of food stuffs is outlined and described, and a table is included which shows the analysis of the common food-stuffs, divided under the following heads: cereal grains, leguminous seeds and their products, oil-bearing seeds and their products, milk and its products, slaughterhouse by-products, miscellaneous concentrates, dried forage, straw and chaff, root and tubers, miscellaneous green forages, and silage.

In the concluding chapter, the Assistant Live Stock Commissioner points out the value of the live stock industry, its high place in agriculture, the possibility of permanence, the outlook for the future and the necessity of seizing the opportunity now presented for the securing of permanent markets.

MANITOBA

The Home Vegetable Garden, Boys' and Girls' Club series, Circular No. 4, by J. A. Neilson, B.S.A., Lecturer, Horticultural Department, and W. T. G. Wiener, B.S.A., Extension Service, Manitoba Agricultural College. The present year is to be especially devoted to gardening in the boys' and girls' club work; in view of this, Circular No. 4 has been prepared expressly for those taking part in the potato-growing

and home garden contest, and includes general gardening instructions and recommendations, as well as special instruction for individual garden crops.

Garment Making, Boys' and Girls' Club series, Circular No. 7, by Miss Elizabeth Blackburn, Demonstrator, Extension Service, Manitoba Agricultural College. This circular is prepared for those taking part in boys' and girls' club contest, No. 7, "Garment Making". In it, the author has given general instructions in the art of sewing, outlined the equipment necessary and concluded by describing a number of specific projects, which might be undertaken by girls of various ages.

Blackleg (A Disease of Cattle), by C. D. McGilvray, M.D.V., Lecturer in Veterinary Science, Manitoba Agricultural College, and Chief Veterinary Inspector for Manitoba of the Health of Animals Branch, Ottawa, is Circular No. 39, of the Manitoba Department of Agriculture. Blackleg is described in this circular as a disease of cattle, characterized by a high death rate; a disease caused by a specific germ which exists in the soil in some localities; a disease which cannot be successfully treated owing to the rapidity with which it becomes fatal.

Protection against this disease, however, is afforded by the use of blackleg vaccine, the use of which is described, illustrated and recommended.

Management of the Brood Mare and Foal, by C. D. McGilvray, M.D.V., Lecturer in Veterinary Science, Manitoba Agricultural College, constitutes Extension Bulletin No. 11, Vol. 2, of the Manitoba Farmers' Library. The following paragraph serves as an introduction to this bulletin and well explains its purpose and scope: "In the management of the pregnant, or in-foal, mare, the essential consideration is to secure a thrifty condition conducive to the well-being and profitable utilization of herself and offspring. The mare must safely carry the foal throughout the required period of gestation until it is born, and the foal must then be safely preserved during the earlier periods of its new existence."

Seed Growing Contest No. 2 of the Manitoba Boys' and Girls' Clubs is the subject of Circular No. 2 of the Boys' and Girls' Clubs series. This bulletin is written by Mr. T. J. Harrison, B.S.A., Professor of Field Husbandry, and W. T. G. Wiener, B.S.A., Field Husbandry Specialist, Extension Service, Manitoba Agricultural College, and outlines the object of the contest in seed growing, giving the general rules, prizes, basis for awarding prizes, general instructions for the cultivation of the land and the treatment and sowing of

grain. The contest is divided into ten sections as follows: $\frac{1}{2}$ acre of wheat, $\frac{1}{2}$ acre of oats, $\frac{1}{2}$ acre of barley, $\frac{1}{2}$ acre of winter rye, $\frac{1}{2}$ acre of western rye grass for seed, 1-10 acre of swede turnips for seed, $\frac{1}{2}$ acre of alfalfa for fodder, $\frac{1}{2}$ acre of Indian corn for fodder and crop rotation. Special instructions are given with regard to each section, and complete directions given for the handling of each of the crops included in the contest.

SASKATCHEWAN

The Saskatchewan Rural Education Monthly for February, has brief, timely articles on the following: Production in School Gardens, School Gardens and School Fairs, Rural Education Associations, and Household Science.

Rural Education Associations and Their Activities. As the title implies this is a sketch of the history and operations of the rural education movement in Saskatchewan. It comprises 16 pages and is School Agriculture Circular No. 7, published by the provincial Department of Education. It contains rules governing cultivation contests and for forming an association, and gives a list of the associations already formed with their officers. A statement regarding school fairs shows that there were 84 held in the province in 1916, that 10,000 children took part, that there were 40,000 entries, that there was an attendance of 19,000 and that 550 schools were represented. Of the annual report of the Department of Education, nineteen of the 123 pages are devoted to a report by Mr. A. W. Cocks, Director of the School of Agriculture, in which the various activities of the Department in prosecuting agricultural instruction are fully dealt with.

ALBERTA

Agriculture and Gardening in Elementary Schools. This is a 125-page bulletin issued by the Department of the province of Alberta that goes very thoroughly into its subject. It constitutes in fact a text book alike for teachers and pupils. Commencing with the rules and regulations of the grants that are made for instruction in science, agriculture and school gardening, complete details are given of the course of study that should be adopted in the various grades. Suggestions follow to teachers in methods of instruction with full explanations of the different branches of the study of elementary agriculture, in the first instance, and then of school-gardening with plans, diagrams and a series of half-tone illustrations, the whole forming an exceptionally complete exposition of the matters covered by the title.

BRITISH COLUMBIA

The Disinfection of Seed-Potatoes is the title of a circular recently issued by the Horticultural Branch of the British Columbia Department of Agriculture and prepared by J. W. Eastham, Plant Pathologist.

This circular gives complete instructions for the disinfection of seed potatoes, outlining the formaldehyde and the corrosive sublimate treatments.

Breeding and Selection of Commercial Poultry, by H. E. Upton, Provincial Poultry Instructor, is Bulletin No. 74 of the British Columbia Department of Agriculture. As indicated in the title of this bulletin, the subject of poultry receives treatment from a commercial standpoint, and is written to give information on the selection and building up, or keeping up, the strong characteristics of the stock without sacrificing egg production. Many illustrations and the descriptive use of a score card for general purpose and utility or commercial fowls point the way to reasonably successful selection of the bird best suited for the production of eggs.

MISCELLANEOUS

Western Canada Live Stock Union. A verbatim record of the proceedings at the

fourth annual meeting of the Western Canada Live Stock Union, held at Calgary on Nov. 22 and 23, 1916, recently issued in book form, contains addresses by leading authorities of both the Dominion and the province of Alberta and comprises 140 pages.

The Prairie Chicken—Its Distribution and Need of Protection—by J. P. Turner, Past-Secretary, Manitoba Game Protective Association, is published by authority of Hon. Valentine Winkler, Minister of Agriculture and Immigration. The Prairie Chicken, the typical game bird of the Western Provinces, in common with many other birds and game animals, is today threatened with extermination. To interest the public in the protection of the two species of prairie grouse—the pinnated and the sharp-tailed—is the object of this work. The author points out that as a destroyer of weeds and insects the grouse is one of the farmer's best friends, but through the attacks of the goshawk, the coyote, the owl, etc., and, more particularly, through the onslaughts of man, the "Chicken", as it is commonly termed, is fast decreasing, with consequent prospect of utter extermination, accompanied by an increase of harmful insect life. That these conditions may be avoided, through protection, is the hope of the author.

NOTES

The Board of Trade of Hamilton has added a farmers' section.

The British Columbia Fruit Growers' Association has recently issued its 1917 price-list of spray materials and fertilizers to members in good standing.

F. S. Jacobs, B.S.A., Professor of Animal Husbandry at the Manitoba Agricultural College, has resigned and will take up farming in the province of Alberta.

The annual convention of the Western Canada Irrigation Association will be held in Maple Creek, Saskatchewan, on August 1st, 2nd and 3rd, 1917. The acting secretary of the association is Robert J. C. Stead, Calgary, Alberta.

On the opening day of the live stock show at Regina, Sask., March 13, 154 head of beef cattle, mostly bulls, sold for a total of \$41,654, an average of \$270.48. The highest price paid was \$650 for the Hereford bull, Viewlands Perfection.

The production of butter, cheese and eggs along the line of the Canadian Northern Railway in the three provinces of Manitoba, Saskatchewan and Alberta showed an increase of shipments in 1916 from 1915 of 1,605 tons of butter, 79 tons of cheese and 583 tons of eggs.

The British Columbia Government, through the Department of Agriculture, has thrown open for vacant lot cultivation a large part of the Indian Reserve north of the E. & N. tracks and west of the Canadian Northern right of way.

The Ontario Department of Agriculture, through the office of Dr. G. C. Creelman, Commissioner of Agriculture, has issued Circular A, "Increased Yields—Little Extra Labour". This circular calls for a supreme effort on the part of the Ontario farmers towards crop production in 1917, and points out the great necessity of using large, plump seed, careful preparation of the seed and thorough preparation of the soil before sowing.

Under the heading "Prevention of Waste", directions are given for the treatment of grain for smut and other diseases.

Live Stock Commissioner, W. T. McDonald, of British Columbia, states that the six-year-old Ayrshire cow, Grandview Rose, has completed an official yearly record with 21,423 pounds of milk and 890 pounds of butterfat, establishing a new record for the breed in Canada. Grandview Rose was bred and is owned at Cloverdale, B.C.

The Public School Board of the city of Ottawa has purchased a piece of land about two hundred feet square for a school garden. The land purchased is that upon which a school garden was conducted last year. The work was referred to in THE AGRICULTURAL GAZETTE of November, 1916.

W. G. Collins, B.S.A., District Representative of the Ontario Department of Agriculture for Thunder Bay District, announces the organization of two live stock improvement associations for the purpose of increasing the number of dairy cattle kept, and for the general improvement of the same.

Rural Science Schools will be conducted in New Brunswick by the Department of Agriculture at Woodstock and Sussex. These schools will open on July 10th and close on August 10th. Nature Study, elementary agriculture and topics relating to practical education comprise the subjects to be dealt with.

The Secretary for Agriculture for Nova Scotia, Mr. M. Cumming, has formulated a scheme whereby citizens are to help increased production by supplying farmers with fertilizers in return for vegetables. A circular of agreement has been drawn up by which the farmer agrees to use the fertilizer in addition to his own and to return vegetables, grain or garden stuff of equal value in purchasing price to the fertilizer.

The Manitoba Weed Inspectors of the province of Manitoba, met in convention on April 4th, 5th and 6th. Addresses were delivered by the Honourable V. Winkler, Minister of Agriculture, the members of the Weeds Commission, and some of the professors of the Agricultural College. The subjects discussed included: Identification and eradication of noxious weeds; methods of cultivation most conducive to increased production and at the same time calculated to control and eradicate weeds; benefits to be derived from diversified farming and rotation of crops; and the administration of the Weeds Act.

The Directors of the Centre Algoma Agricultural Society recently decided to conduct a potato-growing competition under the Ontario Field Crop Competition provisions and decided to limit the number of varieties of potatoes in the competition to one early and one late variety. With a view to encouraging the production of seed potatoes in the district, the Society has undertaken to secure registered seed for the farmers at cost.

Mr. Wm. E. Scott, Deputy Minister of Agriculture for British Columbia, announces that the women's institutes of the province will this year conduct poultry-raising competitions amongst the members of the institutes. The rules and regulations governing these competition state that any institute wishing to organize a competition must secure at least ten competitors before the organization will be recognized and that all competitors in any district must raise chickens of the same breed. The breeds to be used are the following: Plymouth Rocks, White Wyandottes, White Leghorns, Buff Orpingtons or Rhode Island Reds.

The Live Stock Branch of the British Columbia Department of Agriculture has decided to include pure-bred bucks (male goats) in the distribution of pure-bred sires to farmers' institutes. These animals will be distributed on a distinct understanding that the institute will be responsible for payment of same; payment to be made in two instalments, the first on delivery and the second, one year after; the Department to pay all transportation charges and to collect from the institute only the initial cost price of the animal; 10 per cent interest per annum to be charged on overdue payments.

The chief varieties of tobacco recommended by the Central Experimental Farm for Ontario are White Burley, which is air-cured; snuff, which is fire-cured; and Warne and Hickory Prior, which are flue-cured.

The soils giving the best results with White Burley are those known as "sandy" or "gravelly". They are rich in potash and humus, are of a greyish or brown colour and are well-drained. This land is usually rolling. The lower lands have not given as good results, as they remain wet longer in the spring and are frequently higher in clay content. The best crops of tobacco in Ontario last season were grown on very open soils, having sandy to gravelly subsoils to a depth of three to four feet, underlaid with clay.

The Department of Agriculture of British Columbia is giving special attention to the potato industry. As a first step, the departmental organization for the purpose is changed somewhat, so that all potato work will be under the direction of the Horticultural Branch. Every encouragement is being given to select good seed only and to grow as much of this crop as possible. To get potato growers started right on seed selection and disinfection, practical demonstrations were given throughout the province by department experts during the latter part of March and early April. At these Demonstrations, growers were instructed in the diseases of potatoes, how to guard against them, how to select seed potatoes, and how to start plots for future use.

The Agricultural Societies Branch of the Ontario Department of Agriculture is this year conducting standing field crop competitions.

Societies can enter two crops making their selection from the following: spring or fall wheat, white oats, barley, rye, flint corn, peas, alsike clover, alfalfa, red clover, potatoes, mangels, turnips, beans or other staple crop grown for seed in Ontario. The Government grant to a society will be \$50 for each crop, making a total grant of \$100 if two crops are entered. This amount must be supplemented by the society to the extent of \$25 for each competition, thus making the total amount of prize money for one crop \$75, for two crops \$150.

The Women's Institute Division of the Department of Agriculture of New Brunswick is arranging for a series of meetings to be held during the summer and fall months. Every women's institute in the province will be visited and each branch has the privilege of choosing a subject for an address, or selecting a cooking demonstration. The Department is urging the women's institutes throughout the province to utilize every available piece of ground this year for growing vegetables. It is recommended that in towns where vacant lots are used that committees from the institutes take turns in caring for the gardens. The suggestion has been offered that crops could be sold and the proceeds turned over to the Red Cross. The Department expects women's institutes to make a good showing in the New Brunswick-grown canned fruits and vegetables at the provincial exhibition to be held in Fredericton. Prizes will be awarded to the institutes for the quality of fruits and vegetables.

Under the initiation and inspiration of Mr. H. A. Dorrance, B.S.A., District Representative of the Ontario Department of Agriculture for Dufferin county, and with the co-operation of the local Business Men's Association, a series of farmers' week meetings was held in Orangeville early in March. While the farmers' gatherings were held in the opera house the ladies interested assembled in the library building. It is estimated that there was a total attendance of 2,400. Addresses were delivered by a number of leading agricultural authorities, including Dr. G. C. Creelman, Provincial Commissioner of Agriculture; Mr. H. S. Arkell, Dominion Assistant Live Stock Commissioner; Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture, Ontario; Professor H. G. Bell, Agronomist, Illinois; Mr. A. Leitch, B.S.A., Farm Manager, Ontario Agricultural College, and Mr. George Hogarth Chief Engineer of the Highways Branch, Ontario. An exhibition of wool, eggs farm implements and domestic appliances was held with demonstrators in attendance, and entertainers were present at each meeting. It was the first series of the kind held in Ontario.

Field Crop Competitions will be conducted by the members of the Ontario Vegetable Growers' Association in the following classes of vegetables: onions, tomatoes, celery, and early potatoes of any one variety. For the purposes of this competition the province is to be divided into four districts as follows:

District No. 1, Ottawa, Kingston, Belleville.

District No. 2, Toronto, Welland, Clinton and Louth.

District No. 3, London, St. Thomas, Stratford, Brantford, St. Williams.

District No. 4, Blackwell, Sarnia, Tecumseh.

The plots entered for each of the above named vegetables must be not less than one-quarter of an acre in one block. Substantial cash prizes are being offered in each district as well as prizes offered by the Canadian National, Central Canada and Western fairs open to the prize winners in the different districts.

A gardening contest is also being conducted by this association, for which purpose the province is divided into the four districts already mentioned. Each garden must contain not less than three acres. Judging will be done twice during the season, the first not later than July 10th, and the second not later than August 10th. Substantial cash prizes are being offered.

INDEX TO PERIODICAL LITERATURE

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Increasing Dairy Profits by Cutting Production Cost, E. S. Archibald, page 399.
April 7.—The Cattleman's Worst Enemy—Abortion, E. S. Archibald, page 445.
April 14.—Should We Plant New Apple Orchards, H. S. Fry, B.S.A., page 483.
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How Alberta Government Helps the Farmer, J. McCaig, Editor, Agricultural Publications, page 2.
April 16.—Government Aid to Farmers in British Columbia, W. E. Scott, Deputy Minister of Agriculture, page 2.
April 6th.—How City Men May Help Increase Production. Unique plan suggested by Principal Cumming—Getting Back In Kind, page 6.
- Farm and Dairy and Rural Home*, Toronto, Ont., April 5, 1917.
Silage Crops for Nova Scotia. A Comparison of O. P. V. and Corn Silage, Professor J. M. Trueman, N.S.A.C., Truro, N.S., page 384.
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Farm Book-keeping, D. M. Hays, Medicine Hat, Alberta, page 304.
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Ontario's Demonstration Orchards, W. F. Kydd, Department of Agriculture, Toronto, Ont., page 107.
The Profitable Use of Artificial Fertilizers, Prof. R. Harcourt, O.A.C., Guelph, page 111.
Bee-keepers Can Help Produce Feed, F. W. L. Sladen, Dominion Apiarist, Ottawa, Ont., page 117.
- Farmer's Advocate and Home Journal*, Winnipeg, April 4, 1917.
Notes on Vegetable Gardening, J. A. Neilson, Manitoba Agricultural College, page 515.
April 11.—Fodder Crops Suitable for Central Alberta, G. A. Hutton, Superintendent, Experimental Station, Lacombe, page 559.
- The Saskatchewan Farmer*, Moose Jaw, Sask., April, 1917.
How to Vitalize the Teaching of Agriculture. Professor P. G. Holden, Director Agricultural Extension Department, International Harvester Company, page 22.
- The Canadian Entomologist*, London, Ont., April, 1917.
Popular and Practical Entomology. Collecting Wasps and Bees, F. W. L. Sladen, Ottawa, Ont., page 113.
- Fruit and Farm Magazine*, Vancouver, B.C., April, 1917.
The Evolution of Agriculture, L. S. Klinck, Dean of Agriculture, University of British Columbia, page 6.

PART V

The International Institute of Agriculture

T. K. Doherty, L.L.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

THE December number of *The Bulletin of Foreign Agricultural Intelligence* recently distributed is the last issue of that monthly periodical, which has been published for the last six years.

A committee representing both Houses of Parliament, appointed to study and report upon ways and means of effecting economy in government printing, in their report, which was laid before Parliament, recommended among other things that *The Bulletin of Foreign Agricultural Intelligence* be discontinued and the best features of it incorporated in THE AGRICULTURAL GAZETTE OF CANADA, and, further, that THE GAZETTE be distributed free to all Canadian farmers who apply for it.

The Honourable the Minister of Agriculture has decided to give effect to the recommendations of this Committee by discontinuing *The Bulletin of Foreign Agricultural Intelligence* in its separate form and devoting a section of THE AGRICULTURAL GAZETTE to the most valuable information made available by the International Institute of Agriculture. Since this information, like the contents of THE AGRICULTURAL GAZETTE, is of primary value to agricultural officials, demonstrators and teachers, it has been deemed consistent with the efforts to effect economy not to extend the free circulation of THE GAZETTE beyond the class of readers for whom it was

originally intended.

Hereafter, therefore, and commencing with the present number of THE AGRICULTURAL GAZETTE, the more informative and striking features of *The Bulletin* will appear as a section of THE GAZETTE.

On account of the delay in the printing of the November and December numbers of *The Bulletin of Foreign Agricultural Intelligence* and pending the completion of arrangements to proceed under the new plan, there have reached the Institute Branch, and have to be dealt with in this communication, the August and September numbers of *The International Review of the Science and Practice of Agriculture*, the November, December and January numbers of *The International Review of Agricultural Economics*, and the January and February numbers of the *International Crop Report and Agricultural Statistics*. With the limited space available in THE GAZETTE it will be possible to reprint only a small number of the original summaries. A few, however, are here reproduced from *The Institute Bulletins*, extracts are made from others, and a certain number are briefly summarized; the greater number of the articles, however, are merely indicated, such indication taking for *The Economic Bulletin* the form of a list of the principal contents. There is being held in reserve at the office of the Institute Branch a small number of copies of

the original publications which, in so far as the supply may be available, will be sent to the readers who particularly desire to receive the full information thus briefly outlined.

The original Institute publications being a summary of very valuable information not easily obtained elsewhere, readers of this section of THE GAZETTE are encouraged to subscribe for the originals. In order to facilitate subscriptions application may be made for that purpose direct to the Canadian Institute Commissioner.

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, In-

stitute Commissioner, Department of Agriculture, Ottawa.

Unless application through the Canadian Commissioner is preferred, the original Institute Bulletins may be obtained direct from the General Secretary of the International Institute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

	Per annum
International Review of Agricultural Economics.....	18 francs
International Review of the Science and Practice of Agriculture.....	18 "
International Crop Report and Agricultural Statistics.....	6 "
The three bulletins together....	36 "

SCIENCE AND PRACTICE OF AGRICULTURE

CROPS AND CULTIVATION

959—Contribution to the Study of the Forms in which Phosphoric Acid occurs in the Soil.—JEGOROV M. A., in *The Agricultural Gazette of Southern Russia*. Nos. 13-14 and 15, pp. 4-5; 4-5. Kharkov, April, 1916. (pp. 1248-1249 Institute Bulletin).

960—Method of Sterilisation and Chloroforming of the Soil in the Study of the Properties of "Tchernoziom".—SHALSKIJ S. in *The Agricultural Gazette of Southern Russia*, Year XVIII, Nos. 1; 2; 5; 7 and 9; pp. 7-8; 6-7; 5-7; 9-10. Kharkov, January-February-March 1916. (pp. 1249-1253 Institute Bulletin).

962—Catalytic Manures: Manganese as a Catalyser of the Biochemical Reactions by means of which Plants Assimilate Atmospheric Nitrogen through Bacterial Agency.—DE GREGORIO ROCASOLANO ANTONIO, in *Revista de la Real Academia de Ciencias exactas, físicas y naturales de Madrid*, Vol. XIV, No. 10, pp. 681-693, 3 diagrams. Madrid, April 1916. (pp. 1256-1257 Institute Bulletin).

963—Successful Treatment with Insecticides of Plants in Flower.—SHREIBER A. F., in *Bulletin of Applied Botany*, IXth Year, No. 4 (89), pp. 174-175. Petrograd, April 1916.

After referring to the experiments by Prof. S. Glasenap, on the successful treatment with tobacco juice of apple trees in flower the writer gives the results of his own experiments at Irkutsk (Siberia) on an experimental field for the cultivation of medicinal plants.

The experiments were carried out on *Calendula officinalis* L. which is very liable to the attack of the larvae of *Mamestra brassicae*, these latter devouring the leaves. One part of the plants in the field was sprayed with dilute extract of aloes and the other part with a solution of extract of *Veratrum album*. Two successive sprayings were made which killed off all the larvae. This treatment did not reduce the crop of seeds, and the plants watered in this way when in flower all yielded ripe seeds.

964—Osmotic Pressure of Soil Moisture and Glassiness of the Grain of "Bielotourka" Wheat. (From the Works of the Laboratory and Growing Shed of the Scientific Agricultural Station of Bezentchouk, Province of Samara, Russia).—TOULAIKOV N., in *Review of Experimental Agriculture*, Vol. XVII, Book I, pp. 79-91. Petrograd, 1916, (pp. 1257-1260, Institute Bulletin).

852—Amount of Humic Substances in Decomposing Leaves (Laboratory of Scientific Agriculture of the University of Petrograd).—TRUSOV A. C., in *Agriculture and Sylviculture*, Vol. CCL. year LXXVI, pp. 339-361. Petrograd, March, 1916.

Continuing his researches into the humification of the elements which constitute the vegetable organism (1), the writer now communicates the results of his experiments into the quantity of humus soluble in water and dilute ammonia, produced in the leaves of maple and birch in decomposition; the influence of the conditions under which decomposition takes place; a comparison

between the two methods of determination of humic substances, namely the colorimetric method and the permanganate of potash method; and the composition of the humic substances extracted from the decomposing leaves; finally he also gives the conclusions drawn on the basis of these experiments.

Conclusions. 1. The content of water-soluble humic substances varies according to the decomposed leaves; for instance, for autumn leaves of the maple which have just fallen, after 4 days' decomposition this content is 1.93 per cent and represents about 50 per cent of the total content of humic substance.

2.—In the course of the gradual decomposition of freshly fallen autumn maple leaves, the quantity of water-soluble humic substance increases at first and then falls off, a contrary phenomenon to what one would *a priori* assume, seeing that the source of the humus is not the whole of the vegetable substance, but only some of its particular constituents. It follows from this that it is during the first period of its decomposition that vegetable residue takes the most active part in the formation of the soil humus.

3.—The same phenomenon, namely, initial increase followed by subsequent reduction of humic substance, is also disclosed in the case of ammoniacal solutions of this substance. These facts prove clearly that humic substance is chiefly formed during the first period of decomposition of vegetable detritus. Then, evidently, this substance itself is partly decomposed and passes partly into other forms of humic combinations.

4.—The ratio between the quantity of water-soluble humic substance and that soluble in ammonia varies with the different leaves undergoing decomposition and the different periods of the process.

5.—The content of humic substance in decomposing leaves depends on the conditions under which decomposition takes place; it declines when repeated desiccation of the leaves occurs and to any considerable extent.

6.—Although the decomposition of the vegetable residue lasted 100 days, the quantity of humic substance formed in the first 8 days was not increased, and after 156 days its solubility in water had completely disappeared.

(1). See Bulletin Foreign Agricultural Intelligence. March, 1916, No. 888. May 1916, No. 11.

966—Experiments in Siberia, on Different Varieties of Oats.—(Communicated by the Establishment for Seed Production of Smoline L. D. and Skalosoubov N. L., situated near Kurgan, Government of Tobolsk, Siberia).—Skalosoubov. N. L.,

in *Agriculture and Sylviculture*, Year LXXVI, Vol. CCL, pp. 562-571. Petrograd, April 1916. (1264-1265 Institute Bulletin).

967—Work in Tobacco Selection at the Experimental Station of Djember, Residence of Besoeeki, Java, from 1912 to 1915.—SPRECHER ANDREAS, in *Mededeelingen van het Besoeekisch Proefstation*, Nos. 6-9-12-18, 1914 and 1915. (pp. 1265-1272 Institute Bulletin).

857—"Thule", a Variety of Wheat suited to Central Sweden.—NILLSON-EHLE H., in *Sveriges Utsädesförenings Tidskrift*, XXVth Year, Part I, pp. 5-23, Malmö, 1916.

During the period 1889-1913 wheat growing in Sweden increased almost two-fold, thanks chiefly to the selection work carried out at the experimental Station of Svalöf, for the purpose of combining in a single variety, the "high productive" character of the best types with the "cold resistance" character of the native Swedish wheat.

The increased productivity of grain however was anything but uniform. From a maximum of 200 per cent in the districts of Hallands, Malmöhus and Kristiastads, and generally throughout Southern Sweden (Scania), a minimum of 20 to 30 per cent is reached in the central provinces (Svealand). What is the reason of this? In Scania, during the period 1889-1913, the native wheat was gradually replaced by more productive kinds, while the area sown also increased. On the other hand in Svealand this substitution was only possible within very narrow limits, chiefly owing to the special climatic conditions, which involved very cold winters and long periods of drought in summer. For the wheats to be cultivated in the central provinces, therefore sufficient cold-resisting powers and earliness are required to ensure normal ripening and a good yield of grain. These circumstances render the work of hybridisation and selection very difficult, as it is necessary to exclude some of the types which, though among the best in point of yield, are not sufficiently resistant to low temperatures. On the other hand, the increase of the area under wheat in Svealand, the good quality of the soil and the conditions of the agricultural environment, which are as favourable as possible, fully justify all the investigations and work which have for their object the creation of types better adapted to the climate, and at the same time having a high cropping power.

From 1904 onwards the writer has been working at the following problems; (1) the improvement of local native types by selection; 2) creation of new kinds by crossing with the native form; among these crosses the best results were obtained by hybridising the native with the "Pudel";

and afterwards, by perfecting the resulting products by continuous work of selection a new variety was fixed, *Thule I*, presenting the following scheme of characters:

	Pudel	Thule	Native
Productivity.....	+	+	—
Resistance to cold.....	—	(+)	+
Resistance to rust.....	+	(+)	—
Rigidity of culm.....	—	+	—
Earliness.....	—	(+)	+
Quality of grain.....	—	(+)	+

As will be seen, *Thule I* represents a combination superior as regards characters to that of each of the parents. In productivity (3943 lbs. per acre) it is nearly equal to the "Pudel" (3930 lbs. per acre), but is considerably superior to it in earliness and cold resistance, as was ascertained particularly during the winter of 1912-1913, when the sowings were very much injured by the low temperatures.

Thule II, resulting from the same cross and isolated by the writer at Svalöf, is still earlier. It is as early as the native type and is more productive than *Thule I*. These two kinds are distinguished from the native Swedish variety by their high resistance to rust. There is consequently no doubt that the *Thule* wheat is superior to all others hitherto tested in Svealand, where it may be introduced with the certainty of success.

As regards improvement of the native varieties by direct selection, the pure line 0750 (of Latorpsheve) from Svalöf was cultivated for 3 years at Ultuna. It is distinguished by its higher cropping power, and could perhaps furnish good material for crosses.

Although the *Thule* wheat is very resistant to cold, it still remains inferior to the native types; it must therefore be improved in this direction. With this object from 1913 onwards, a series of hybridisation trials were undertaken of *Thule I* and *Thule II* with the Swedish native wheat; the preliminary results hitherto obtained fully justify the method adopted and hold out the best prospects.

860—Injuries to Rye and Wheat Grain produced by Threshing, and their Consequences.—WALDEN J. N., in *Sveriges Utsädeforenings Tidskrift*, XXVith Year, Part 1, pp. 24-47, 8 tables, 2 figs. Malmö, 1916.

Experiments carried out by the writer prove that the injury caused to grain by threshing, even if very slight, reduces the vitality of the grain, rendering it very sensitive to the action of copper sulphate used for seed disinfection. This sensitiveness is found especially in grain put through ordinary threshing machines. It decreases on the other hand when a small special threshing machine is used, as at Svalöf,

and it completely disappears in grains husked by hand. In the latter case, the germination capacity of the grains is not even affected by the use of 10-25% solutions of copper sulphate.

By means of a new method, it was possible to ascertain accurately the location and extent of the injuries in a very large number of grains of different origins. The grain is thus divided into 3 classes: (a) grain without injury; (b) with light injury; (c) with severe injury. The sensitiveness of the grain in relation to formalin and copper sulphate varies considerably for the 3 categories, as may be seen from a table given in the original article.

The method contrived by the writer for rapidly ascertaining the extent of the injuries sustained consists in submerging the grains to be examined in an 0.4 % solution of eosin, and afterwards washing them in water. Where there is a break in the continuity of the integument, the eosin is absorbed, and communicates a conspicuous red hue to the injured portion. For graduating the extent of the injury the following scale has been adopted: 0, no visible or very slight colouring; $\frac{1}{4}$, colouring at end; $\frac{1}{2}$, one half at least of the surface of the embryo is strongly coloured; 1-1 the entire surface of the embryo is strongly coloured. This very simple system allows the farmer to determine with sufficient accuracy to what extent the injury produced by threshing can impair the germination faculty and the keeping property of grain.

969—Liquid Manure with Addition of Sulphuric Acid as Spring Manure and Means of Control against Weeds and Lodging of Wheat. Sulphur treatment against the Parasites of Lodged Wheat.—GIGLIOLI ITALO, in *Bollettino della Società degli Agricoltori Italiani*, Year XXI, No. 9, pp. 257-266. Rome, May 15, 1916. (pp. 1273-1275 Institute Bulletin).

863—Comparison between the Effects of Manuring Potatoes with Nitrate of Soda and Sulphate of Ammonia (From the Experimental Station of Radomysl, Russia).—ZASUKHIN A., in *The Farm*, Xlth Year, No. 17-18, pp. 297-304. Kiev, May, 1916.

Experiments carried out at the Agricultural Experiment Station of Radomysl in sandy soil, i. e. poor in nitrogen, and for which nitrogenous manure is of great importance. Two nitrogenous manures were studied: nitrate of soda and sulphate of ammonia. The trials made with the latter manure are particularly important because, owing to the present war, the importation of nitrate of soda into Russia has greatly diminished, while large stocks of sulphate of ammonia have accumulated,

and the extensive use of the latter in agriculture is imperative.

The observations made point to the following conclusions:

1) Sulphate of ammonia gave a larger yield as compared with nitrate of soda.

2) A bigger crop was obtained by applying sulphate of ammonia to the tuber than by spreading it before planting.

3) By applying the dressing of nitrate of soda to the tuber, the development of the potato in its first period of growth was considerably retarded. As regards the crop, it appears nearly equal, whether the nitrate of soda is applied to the tuber or is spread before planting.

4) By giving half of the nitrogen in the form of nitrate of soda to the tuber, and the other half in the form of sulphate of ammonia to the soil where it is spread before sowing, no advantage was secured as compared with manuring the potato with sulphate of ammonia alone.

For a more accurate interpretation of the results of these tests, it should not be forgotten that the spring and the first half of the summer were very dry.

972—**Destruction of the Bean Germ.**—BUSSARD, in *Comptes Rendus de l'Académie d'Agriculture de France*, Vol. II, Year 1916, No. 19, pp. 550-551. Paris, 1916.

A method was required of destroying bean embryos without injury to the cooking value of the seed. The experiments covered three varieties: Algerian white, black and red beans. The experiments proved that when only a few seeds are concerned, immersion for one minute in boiling water is sufficient to deprive seeds which were previously capable of germinating in the proportion of 95 % of all germination capacity. When dealing with several pounds it will be prudent to prolong the immersion for 4 to 5 minutes. This time should not be exceeded, to prevent any cooking action being begun. The scalded beans, on drying in the open air, by spreading them in a thin layer on a flat surface, rapidly give up the water they have absorbed. Within 24 to 28 hours the bean appears to be perfectly dry, slightly wrinkled, and rather duller than the normal. It possesses very good keeping properties, and its cooking qualities are not impaired.

975—**Economic Desirability of Tree Planting in Grasslands.**—SPIRIDONOV N., in *Agricultural Gazette*, No. 12 (128), pp. 310-311. Petrograd, March 1916. (pp. 1283-1284, Institute Bulletin).

976—**Moisture Content and Shrinkage of Forage and the Relation of these Factors to the Accuracy of Experimental Data.**—VONALL H. N. and MCKEE ROLAND, in *United States Department of Agriculture*,

Bulletin No. 353, 37 pp. Washington, D.C., March 13, 1916. (pp. 1284-1287 Institute Bulletin).

LIVE STOCK AND BREEDING

994—**Statistical Data as to increased Weight and Food Consumption of the Jersey and Holstein-Friesian Breeds from Birth to first Calving.**—HAYDEN C. C., in *Ohio Agricultural Experiment Station, Bulletin* 289, pp. 1-30. Wooster, Ohio, August 1916. (pp. 1308-1309 Institute Bulletin).

995—**Progress of the Holstein Breed in the United States.**—*The Breeder's Gazette*, Vol. LXIX, No. 24, p. 1257. Chicago, June 24, 1916.

997—**Experiments in Pig-Feeding carried out by the Experimental Sub-Station of North Platte, Nebraska, United States.**—SNYDER W. P. and BURNETT E. A., in *Bulletin* No. 147 of the *Agricultural Experiment Station of Nebraska*, Vol. XXVII, Art. IV, 56 pp. (Limited Edition); 31 pp. (Popular Edition). Lincoln, Nebraska, 1915. (pp. 1311-1316 Institute Bulletin).

The following subjects are covered: wintering old and young brood sows; wintering cost of young sows with farrow; average cost of feeding porklings until 50 lb. in weight; comparison between cost of production of autumn and spring born porklings; comparison between cost of pigs from old sows and those from young sows; rearing pigs with lucerne pasturage and grain; maize and supplementary feeds for pig fattening; corn and lucerne compared with corn, shorts and lucerne in rearing and fattening pigs; wheat and rye compared with corn for fattening pigs with or without lucerne hay.

998—**Specific Effects of Different Rations on the Growth of Pigs; Experiments at the Ohio Agricultural Experiment Station, United States.**—FORBES E. B., BEEGLE F. M., FRITZ C. M., MORGAN L. E. and RHUE S. N., in *Bulletin of the Ohio Agricultural Experiment Station*, No. 283, pp. 111-152, fig. Wooster, Ohio, 1915. (pp. 1316-1319 Institute Bulletin).

999—**Wheat as a Food for Fattening Pigs; Experiments in Missouri, United States.**—WEAVER L. A., in *University of Missouri, College of Agriculture, Agricultural Experiment Station, Bulletin* 136, 35 pp. 8 fig. Columbia, Miss., 1915. (pp. 1319-1321 Institute Bulletin).

1000—**Egg-laying Competition in Australia.** I. HART A., results of the 5th Egg-laying Competition held in the State of Victoria, Australia, in 1915-1916 in *The Journal of the Department of Agriculture of Victoria*, Vol. XIV, Part 6, pp. 329-340, 8 fig. Melbourne, June 1916.—II. THOMPSON D. S., Results of the 4th Egg-

laying Competition held at the Grafton Experiment Farm, New South Wales, in *The Agricultural Gazette of New South Wales*, Vol. XXVII, Part 6, pp. 433-437. Sydney, June 1916. (pp. 1321-1323 Institute Bulletin).

FARM ENGINEERING

902—**New Method of Fireproofing Wood** (1).—*Engineering Record*, Vol. 72, No. 24, p. 717. New York, December 11, 1915.

This method of fireproofing shingles was tested in the Forests Products Laboratory at Madison (Wisconsin, United States). It is based on the formation of an insoluble salt, borate of zinc, which melts at a high temperature and covers the fibres of the wood with a protective coating.

The air-dried shingles are first impregnated with a watery solution of borax then stove-dried until their percentage of moisture does not exceed 10 per cent. After this they are impregnated with a solution of zinc chloride, once more dried in the stove, and are then ready for use.

The two solutions must be applied under high pressure, which necessitates the use of strong plate reservoirs, pressure pumps, standardised recipients and other comparatively expensive contrivances. Consequently this process can hardly be used to advantage except where large quantities of wood are to be treated.

The experiments have shown that the shingles treated by this process and immersed in running water for two weeks had not lost their fire proof properties thanks to the insolubility of the zinc borate.

When exposed to a fierce fire the shingles treated burn, it is true, but without flame, which is an important quality, because it prevents the fire spreading from one part of the roof to another by the falling sparks or burning brands.

(1) See Bulletin Foreign Agricultural Intelligence, July 1914, No. 462.

RURAL ECONOMICS

1010—**Results of Farm Management Demonstration Work in U.S.A.**—GODDARD L. H., in *Proceedings of the Sixth Annual Meeting of the American Farm Management Association*, Berkeley Cal. 9-10 August 1915, pp. 26-33. Washington, 1916. (pp. 1337-1341 Institute Bulletin).

1014—**Profit ensured in Southern Rhodesia by Treating Potatoes with Bordeaux Mixture.**—JACK RUPERT W., in *The Rhodesia Agricultural Journal*, Vol. XIII, No. 3, pp. 354-360, Pl. I-II. Salisbury, Rhodesia, June 1916.

The writer proposed to ascertain whether from the financial point of view, there was any advantage in treating potatoes with Bordeaux mixture for control of the disease known as "early blight" caused by *Alternaria Solani*.

The experiments, which were continued for three years, dealt with the "Up-to-date" variety, the chief one grown in the region under examination, and also one of the most resistant to the disease. In the experiments, every second row of potatoes was treated and the intermediate row left for control of the results. In this way, the errors due to the differences of fertility in the other plots and those produced by irregularity in the spread of the disease were avoided. Furthermore, the rows treated were nevertheless exposed to infection from the untreated neighbouring rows, while in the latter, the risks of infection by the passage of spores from one plant to another were reduced by the presence of treated rows.

In short, the conditions were such that they tended to reduce the differences of yield due to the treatment between the treated and the untreated lines.

TABLE I.—Increase of yield due to spraying.

Number of days between 2 successive sprayings	Number of sprayings	Total yield			Table potatoes			Seed potatoes			Marketable Potatoes
		Treated	Un-treated	Percentage of Increase	Treated	Un-treated	Percentage of Increase	Treated	Un-treated	Percentage of Increase	Percentage of Increase
		Lbs.	Lbs.		Lbs.	Lbs.		Lbs.	Lbs.		
7	7	104	77	53	38	16	137	41	26	57	88
14	4	87	59	30	15	10	50	41	28	46	47
21	3	87	77	16	19	15	26	48	42	14	17

TABLE II.—*Estimate of profit due to spraying.*

Number days between 2 sprayings	Number of sprayings	Marketable tubers increase per acre lbs.	Value, at 1½c. per lb.	Cost of spraying at \$2.40 per acre.	Net profit per acre. from spraying
7	7	3772	\$ 57 20	\$ 17 00	\$ 40 20
14	4	1836	28 00	9 70	18 30
21	3	1020	25 30	7 30	18 00

In spite of this the differences were considerable, as will be seen from the appended tables, the first of which gives the increase of yield due to the treatment, and the second the profit secured by the operation. The treatment was carried out with a Bordeaux mixture consisting of 4 lbs. of copper sulphate and 4 lbs. of fresh lime per 40 gallons of water. The rows were 2 feet 6 inches apart, and the plants 15 inches apart in the rows.

AGRICULTURAL INDUSTRIES

914 --**Metallic Taste in Dairy Industry Products.**—GUTHRIE E. S., in *Cornell University Agricultural Experiment Station of the New York State College of Agriculture, Department of Dairy Industry, Bulletin* 373, pp. 605-644, 19 tables. Ithaca, New York, April 1916.

The metallic taste, which influences the price of dairy industry products, was first detected in 1901. The writer entered into correspondence with a large number of experts in order to determine exactly what is to be understood by "metallic taste". According to these experts, such taste is closely akin to the fishy taste of oil, tallow, etc., it is difficult to detect, but, nevertheless, qualified men succeed in detecting it when they have become familiar with it.

The writer studied the conditions under which the metallic taste appears in dairy products. He found that the direct absorption of metals may produce this flavour. His observations have furthermore demonstrated that a high content of acid seems essential for the development of the taste, which is more likely to appear during the very hot season. Furthermore, with the exception of butter milk, the taste only appears when the fat content is high. The taste appears suddenly, and low temperatures very often make it more noticeable.

Besides the direct absorption of metals, bacteria may produce the metallic taste. A quantity of butter milk put into sterilized bottles was found to have this flavour in some cases. In 241 samples of cream placed in sterilized glass bottles the metallic taste was produced in 79 by the inoculation of butter milk having that flavour; likewise in 167 samples of cream put into sterilized glass bottles the taste was produced in 52 by inoculation with bacteria.

The writer has studied the microflora of products having a metallic taste; he found on the other hand that the addition of formaldehyde only rarely prevents the occurrence of the taste, which appeared 35 times in 41 samples of butter milk to which there had been added, per 100 cc., from 2 to 30 drops of a solution containing 37 to 40 % of formaldehyde.

Finally the writer endeavoured to ascertain the relation between the production of enzymes and the appearance of the flavour by utilizing products which prevent the growth of bacteria but allow of enzyme action. For this purpose toluene and chloroform were used: the results were not satisfactory, owing to the difficulty of distinguishing and analysing the taste of the liquids treated with these antiseptics. Nevertheless, it seems that the metallic taste can be produced by the action of enzymes.

In the inoculation experiments it was found that the bacteria capable of producing the metallic taste appear to be the same as the well known bacteria found in milk, and belonging to the group *Bacterium lactis acidii*; the only difference, if any, was that the former were a little larger than the types representing the group, but only very slightly. It is therefore concluded that the organism which causes the metallic taste is a member of or derived from the group *Bacterium lactis acidii*.

In an appendix, a bibliographical note gives a list of 8 works.

Industrial Retting of Textile Plants by Microbiological Action.—ROSSI, PROF. GIACOMO. Summarized from the International Review of the Science and Practice of Agriculture. August, 1916, pp. 1067-1073.

The process of retting devised by the Institute of Agricultural Bacteriology of Portici, which is based on the use of the pectic aerobic ferments, the prototype of which is the *Bacillus Comesii*, consists in: (1) immersing the textile materials in ordinary water; (2) raising the whole to the optimum temperature of the bacillus in question, from 82 to 95° F., which temperature must be maintained during the entire period of retting; (3) adding a sufficient quantity of pure culture of the bacillus; (4) passing an air current

through the entire mass during the whole period of retting.

The process is simple. Ordinary vats with feed pipes are used. Any water suitable for retting as practised in rural districts will do. As regards hemp it is preferable that the retting be preceded by green scutching.

A factory using this microbiological method of retting hemp has been erected in France. It comprises the following principal sections: *Hemp stocks, Decauville light railway* with special trucks for conveying the bundles of hemp to the scutching department. *Scutching Department* comprising: a machine for cutting off roots and tops, a drier for the stalks to be scutched, fitted with a boon suction current. *Preparation of cages of scutched hemp and hoist* for conveyance to the retting department. *Retting Department*, comprising a battery of 4 vats of 19.62 cu. yds. capacity each, divided into sub-vats 3 ft. 3 in. wide and 16 ft. 3 in. deep, furnished with a special arrangement for supplying steam, water and air. *Washing and Pressing Department*, containing washing machines and centrifugal driers. These different sections are connected with each other by overhead rails with points, for the conveyance of the cages containing the material for retting and that already retted. From the washing section a hoist runs to the *drying department* (with automatic apparatus supplying a current of hot air). There is also a *special department for the production of ferments*, which is fitted with an automatic producing device.

After two months' work the following report was made:

(1) The production of ferments by means of cultures supplied by our laboratory had always proved very regular and easy.

(2) The retting of the hemp was regularly completed in 48 hours.

(3) The yarns obtained by the *Société textile Alençonnaise* with the hemp retted by our method have been compared with the best quality Italian hemp yarns in regard to fineness and flexibility.

(4) With these yarns the said Company was able to obtain thread No. 16 dry, while the yarns of Sarthe were never able to go beyond the minimum of 7.

(5) The plant never produced offensive smells.

(6) The residual water was discharged into a small stream without occasioning any trouble.

The method has been applied with success to the retting of flax, ramie, agave, jute, etc.

PLANT DISEASES

932—The Part played by Insects in the Spread of *Bacillus amylovorus*.—STEWART V. B. and LEONARD M. D., in *Phytopathology*, Vol. 6, No. 2, pp. 152-158. Baltimore, Md., 1916.

933—On the Susceptibility of *Phaseolus vulgaris* and *P. multiflorus* to Bean Rust (*Uromyces appendiculatus*) and other Fungoid Diseases.—LAKON GEORG., in *Zeitschrift für Pflanzenkrankheiten*, Vol. 26, No. 2, pp. 83-97, Stuttgart, 1916. (pp. 1199-1200 Institute Bulletin).

934—The Selection of Types of Tobacco Resistant to *Thielavia basicola*, in America.—JOHNSTON JAMES, in *Phytopathology*, Vol. 6, No. 2, pp. 167-181. Fig. 6. Baltimore, Md., 1916. (pp. 1200-1202 Institute Bulletin).

936—Studies on the Resistance of *Prunus* spp. to *Bacterium tumefaciens*.—SMITH O. CLAYTON, in *Phytopathology*, Vol. 6, No. 2, pp. 186-194, Pl. VI. Baltimore, Md., 1916. (pp. 1202-1205 Institute Bulletin).

937—Prophylaxis in Vegetable Pathology.—COMES ORAZIO, in *Reale Istituto d'Incoraggiamento di Napoli*, 173 pp. Naples, 1916. (pp. 1205-1211 Institute Bulletin).

The writer points out that though it is still absolutely necessary to resort to therapeutic means whenever the plant is ailing or attacked by parasites, it would be desirable, on the other hand, to take into account what has long been practised in animal pathology. In animals, the extension of the action of hygiene limits the sphere of therapeutics in a greater degree day by day, and in the same way, by more rational attention and more appropriate measures, the cultivated plant must be made stronger, and more capable of resisting the attacks of its enemies; in other words, greater attention must be devoted to the hygiene of the plant.

1034—Researches on the Silver-scurf Disease (*Spondylocidium atrovirens*) of the Potato.—SCHULTZ S. EUGÈNE, in *Journal of Agricultural Research*, Vol. VI, No. 10, pp. 339-350. Pl. XLV-XLVIII. Washington, D.C., 1916.

939—*Phytophthora* sp. Injurious to Oats in America.—MCMURPHY JAMES, in *Science*, New Series, Vol. XLIII, No. IV, p. 534. Lancaster, Pa., 1916.

Specimens of oats attacked by an unidentified species of *Phytophthora* were discovered in the vicinity of the University of Stanford and near Mayfield in California. Symptoms of the disease: spots and stripes of different sizes along the edges, or a long stripe running along the central line of the leaf. The parts attacked are first yellow, then whitish (when the conidia are abun-

dant); finally they become brown, dry and break up.

The conidiophores, which are short and simple, emerge through the opening of the stomata and generally carry a single conidium. Chlamydospores and oospores were likewise found in abundance on the infested parts.

In regard to these characters, this *Phytophthora* approximates to *P. Colocasiae* a parasite of "taro" (*Colocasia esculenta*), in Java, India and Formosa.

INJURIOUS INSECTS

946—White Grubs (*Lachnosterna* spp.) in Wisconsin, United States of America.—SANDERS J. G., and FRACKER S. B. in *Journal of Economic Entomology*, Vol. 9, No. 2, pp. 253-261, Fig. 3. Concord, N.H., 1916.

The results are here set out of a series of researches and experiments on white grubs (*Lachnosterna* spp.) undertaken at Madison, Wisconsin, in 1914-1915.

In order to capture the insects, light traps were employed (Coleman gasoline lamps of 300 to 400 candle power) placed near the receptacles containing water to which paraffin had been added, into which the insects, attracted by the light, fall. In Wisconsin there are five Stations (Lancaster, Dodgeville, Baraboo, Madison and Ripon) each provided with eight lamps.

From May to June 1915 there were captured 1,036,400 specimens of *Lachnosterna* belonging to the following species: *L. fusca*, *L. rugosa*, *L. grandis*, *L. dubia*, *L. hirticula*, *L. gibbosa*, *L. ilicis*, *L. balia*, *L. tristis*, *L. nitida*, *L. implicita*, *L. marginalis*, *L. vehemens*, *L. nova*, *L. prunina*, *L. inversa* and *L. villifrons*, *L. fusca* certainly the most widely distributed species; *L. rugosa* was not reported at Lancaster but was very common in the other Stations lying further north.

In the early morning, in the evening, and generally when the days are cold, the larvae are rarely active and do not feed. On the other hand they are very active and voracious during the hottest hours of the day. Migrations in a vertical direction commenced by the insects under the influence of temperature variations are never observed in the soil. The larvae generally remain at the same level near the surface of the soil from which they only shift to go in search of their food. The latter consists of root or parts of roots. If the larvae are brought into contact with freshly germinated young plants they attack and destroy the radicle without touching the stem. They refuse bran or sweetened dough.

A number of larvae were left for five and a half months in a vessel containing only soil, and no food was given them. At the

end of the period of experiment, two larvae were still alive and active; they had fed only on the small amount of vegetable detritus contained in the soil. In view of this vitality and resistance it is not possible to use control methods based on the starvation principle.

In some experiments carried out on land infested with the larvae of *Lachnosterna*, grasses were transplanted the roots of which had first been steeped in a solution of arsenite of soda; the mortality of the larvae amounted in four days to 22.2 %. Under the same conditions the use of arsenate of lead gives negative results. If roots of young maize plants are poisoned with corrosive sublimate, the mortality of the larvae reaches 50 %.

Excellent results are obtained by protecting the seeds by treatment with creosote; this substance keeps the larvae off.

947—Resistance of Different Varieties of Wheat to *Mayetiola destructor* in America.—HASEMAN I., in *Journal of Economic Entomology*, Vol. 9, No. 2, pp. 291-294. Concord, N.H., 1916. (pp. 1220-1221 Institute Bulletin).

1052—*Galerucella cavicollis*, a Coleopterous Pest of Cherry and Peach Trees in the United States.—CUSHMANN R. A. and ISELY DIVIGHT, in *United States Department of Agriculture, Bulletin* No. 352, pp. 1-28, Fig. 1-9, Pl. I-IV. Washington, D.C., 1916.

In the spring of 1915, the cherry and peach plantations extending over a vast area in the north-east of the United States sustained considerable damage from a sudden and formidable outbreak of *Galerucella cavicollis* Le Conte (cherry-leaf beetle). This already known beetle had never previously caused such extensive injury. Among the regions which suffered most were the States of New York and Pennsylvania and the northern part of Western Virginia.

The adults attack the leaves of the cherry and peach and the fruits of the cherry, gnawing them and producing fairly deep injuries. When the attack is very severe, the plants may be almost completely stripped of leaves. The natural host of *Galerucella* is said to be *Prunus pensylvanica* (bird cherry) which spreads with great rapidity along the road sides in the thickets and on the lands formerly occupied by forests destroyed by fire, which form a very favorable environment for the growth and multiplication of the insect. The latter hibernates in the adult form, leaving its shelter in the spring; it mates and the female oviposits at the foot of the trees amid the dried leaves and other vegetable detritus. The larvae hatch in a fortnight, and when full grown, pupate in a hole which they have made in the soil. The adults emerge in two or three weeks and spread through the plantations where they attack the

leaves and fruits. This continues throughout the good season until the first colds compel them to seek shelter.

Among the natural enemies of *Galerucella* mention must be made of the coleopteron *Lebia ornata* Say, which attacks the adults, tears off the elytra and feeds on the soft tissues. It also kills the pupae and feeds on them, only leaving the pupal skin intact.

For control there are devised: 1) applications of 40 % solutions of nicotine sulphate, in the proportion of one part to 600 of water; the addition of soap (1 part per 200 of mixture) increases the efficacy; 2) applications of sweetened lead arsenate, especially for cherry trees, according to the following formula: 1.3 lb. lead arsenate, 0.33 galls of treacle and 11 galls of waters.

AGRICULTURAL ECONOMICS

THE DANISH CO-OPERATIVE SOCIETIES FOR THE EXPORT OF EGGS

IN 1914 the Danish co-operative societies for the export of eggs sold 16,535,000 lb., that is a quarter of the country's total export.

The society's chief aim is to bring Danish eggs onto the best foreign markets. It attains its object by guaranteeing to purchasers that eggs bearing its mark and classed as fresh eggs are such in fact. It further protects the interests of producers in every way; and it is interested in the preservation of its members' eggs and the sale and breeding of their poultry, and establishes stations which promote scientific and remunerative poultry farming.

The society is made up of circles each of which has at least ten members. Only the circles can become members of the society. Their task is to collect the eggs and send them to the society's centres for despatch.

In order to be able to guarantee the absolute freshness of the eggs the society has organized a minute inspection both of circles and individuals, with the object of thus ensuring the scrupulous fulfilment of the rules for collection and delivery.

Enrolment as member of a circle is binding for a year. A circle must, when enrolling, send a copy of its by-laws and a list of its members, with their order numbers, names and addresses. Intimation of each new enrolment should at once be sent to the society. The management of each circle must see that its by-laws do not violate the society's provisions.

The members engage to deliver to the circle all the eggs their hens produce—except eggs for hatching, those found accidentally and those needed for their own consumption—in the manner and within the interval of time determined by the circle. The obligation thus to deliver eggs lasts for a year and is renewed annually. Eggs more than seven days old must not be delivered. Whoever disobeys this rule or delivers rotten eggs is liable to a fine of five crowns (\$1.34). In case of a second offence within the same solar year the fine is raised to ten crowns. Each egg must

be clean when delivered and, to facilitate the necessary inspection, must be legibly inscribed with the circle's stamp and the member's order number. In order moreover to ensure the uniform stamping of eggs, the circles must procure from dealers designated by the society the stamps and the ink which they remit to their members.

The stamps allow the origin of eggs found to be bad or in a bad condition to be established at once, in the society's despatching offices in which they are examined, the sender of these eggs to be apprised immediately of their state, and the merited fine to be eventually imposed on him.

This system of rigorous fining has certainly not facilitated the society's activities for it has aroused the hostility of many members. But it is an extraordinarily effective method of obliging the members scrupulously to discharge their duties as such, perhaps the only effective method possible to an organization in which each member feels his responsibility to the others less than in such other local co-operative societies as the co-operative dairies.

In the by-laws of the circles it is further prescribed that the eggs must be collected regularly once a day, and twice a day in the warm season, that only artificial eggs may be used to induce laying, and that the hens may not have access too the laying place during the night.

Further, members may deliver to the circles only eggs produced by their own hens. Producers and collecting circles must alike protect the eggs against the action of the sun, rain and cold.

Various rules have further been established which apply both to members and to circles and aim at causing the eggs to reach the consumer in the shortest possible time and in the best possible condition. The circles are obliged to deliver to the society all the eggs they receive from their members within the week in which they receive them. In exceptional cases however the management can make special and temporary rules in this manner. The

society reserves the right to refuse eggs which are dirty or indistinctly stamped, or to accept them at lower prices.

In case a circle does not deliver all the eggs it has received from its members, it loses its right to its share of the profits of the society and the reserve fund for the current year, and it may be expelled by the management of the society.

The authorities of the society comprise the management, the representatives and the general meeting. The management, formed by a manager and four members, is chosen by the general meeting, the former for four and the others for two years.

The manager is also an administrator and with another member of the management forms the administration committee, which fixes prices and constitutes the firm. The signature of two of the members is necessary to bind the society. The management is concerned with the administrative organization; it nominates the technical manager and the other employees whose salaries are fixed by the representatives.

The manager directs on his own responsibility all the society's establishments and represents the society's judgment. He thus acts as technical manager. This arrangement was intended to give preponderance to the technical element in the society's management, a matter of much importance since an enterprise of an almost purely commercial character is in question. The manager receives \$1,500 a year, plus one-half per cent. of the turnover of the preceding financial year. The other members of the management have no fixed salaries but receive payment by the day and compensation if they have to travel.

The representatives number one for each province, elected for a year by members of the circles in his province. The duty of representatives is to see that the by-laws and the decisions of the general meeting are observed. All important business arising out of the ordinary administration should be submitted to the preliminary examination of the representatives, who will decide in the matter if it be not urgent.

The general meeting comprises the management, the representatives and a delegate of each circle. The management and the representatives have no votes unless they are also delegates. The ordinary general meeting takes place once a year; an extraordinary meeting is convoked following on a decision of the management or the representatives, or in

response to a request from one tenth of the circles.

The general meeting chooses two revising accountants who inspect the books once a month.

The capital for the financial year is united, as regards its greater part, a reserve fund being constituted. Half the net profits of the preceding year are distributed to the circles in October, in proportion to the value of the eggs they have provided; the rest is paid into the reserve fund with which the circles are then credited, a special account proportionate to the value of the eggs delivered being opened with each of them. The provision that profits be paid only in October, while the financial year ends in December, is intended to ensure to the society abundant resources in the season favourable to the preservation of eggs. The reserve fund is a guarantee of the engagements of the circles and the members of the society. Neither circles nor members have however, unlimited liability arising out of the society's engagements, but have a liability limited to their share of the reserve fund, which cannot be distributed after the dissolution of the society unless the management decide that its whole sum can be usefully employed. In case of a distribution of the reserve fund among the circles a beginning is always made with the most remote years. Interest is paid at the rate of four per cent to the circles on their shares in the reserve fund, at the same time as profits are paid to them.

The despatching offices take no part in the marketing of the eggs. All the commercial side of the enterprise is entrusted to the central office. All that is incumbent on the despatching offices is the despatch of the goods according to orders received from the central office. The eggs are sent directly from the packing house to the purchaser, the central office being notified of their despatch, and being responsible for all subsequent business with customers.

Similarly despatching offices are not expected to keep accounts with circles, but merely to inform the central office of the quantity of eggs they have received.

All money is received and all payments made as the by-laws rule and by the medium of a bank chosen by the representatives. Payments for the eggs received should be made to the circles with as little delay as possible.

(Summarized from the International Review of Agricultural Economics, December 1916, pp. 11-30).

CO-OPERATIVE MARKETING OF LIVE STOCK IN WISCONSIN

FARMERS' associations for the marketing of live stock in the United States now number 500 and have had some excellent results.

The Muscoda Farmers' "Shipping" Association may be taken to be typical of organizations of this kind in Wisconsin. Its members are a group of farmers who have agreed among themselves to market their live stock together. In November, 1913, they came together and chose a president, a secretary-treasurer or manager, and a yard man.

A farmer desiring to sell by the medium of the association gives a list of his stock to the manager, who keeps a register of the names of associated farmers, the number and kind of animals they have to market, and the approximate weights of these. When the manager sees from his register that he has a truckload of hogs, cattle or sheep ready to be marketed he engages a truck from the railway company by telephone for a particular day; and then, also by telephone, instructs the farmers to deliver their stock in time. On the appointed day it is received, weighed and marked by the yard man, who keeps a list of it and of the owners, weights and marks. The animals are then loaded and sent to Chicago or Milwaukee, according to their number and quality. On the same day the manager sends to the commission house, which will dispose of the stock in the central market, an invoice in which the names of the owners and the weights and marks of the animals are indicated. When the truck reaches the central market it is unloaded and the animals are fed and watered. If they are cattle they are then sorted according to their owners; if they are hogs it is considered more profitable to grade them according to quality. The animals are afterwards weighed and sold; and the commission agent to whom they have been consigned pays, on the very day of the sale, the money due for them into the account which the "Shipping" Association has at a bank. He afterwards makes a report of the sale to the manager of the association, stating the costs of freight, yard accommodation, insurance

and food, as well as the amount of the commission, all of which have been deducted from the gross price.

On receiving this statement the manager in his turn draws up a report setting forth the weight of the animals before their journey and at the central market, the price obtained at the central market for all the stock and for that of individual owners, the individual's share of expenses on the journey and at the market, the commission charged by the association and the share of this falling on individuals. He then prepares a statement and draws a cheque for each individual owner.

The charge of feeding the animals on their journey is based on the number loaded in a truck and the amount of food given them. For hogs the usual charge is from five to eight cents a head. The commission charged by the association to cover expenses and form a small reserve fund is three per cent on the price of cattle and hogs and 15 cents a head on calves. A farmer not a member of the association may market his stock by its means if he pay a commission of 5 per cent on the price of cattle and hogs and 25 cents a head on calves.

The sums thus received pay the manager's salary and the wages of the yard man and his helpers and cover any losses incurred by the death or depreciation of animals during their journey. Thus it may be said that by exacting from the owners a small premium the association insures the live stock against the risks of transport.

In 1915 the association sent out 56 carloads of stock, as against 43 in the previous year; and 155 farmers availed themselves of its services. Precise figures cannot be given as to the amount of extra profit which the farmers derive from such co-operative marketing but it may be estimated approximately at from 5 to 25 per cent. This extra profit might however become a loss if the manager did not watch the market very closely.

(Republished from "The Banker Farmer," in the International Review of Agricultural Economics for January 1917).

LAND SETTLEMENT OF EX-SERVICE MEN IN ENGLAND

THE Board of Agriculture has acquired under the provisions of the Small Holdings Colonies Act, 1916, for the purpose of a land-settlement colony of ex-service men, an estate of 2,363 acres near Pattingham, in the East Riding of Yorkshire, about fifteen miles distant from Hull.

Vacant possession will be obtained on 6 April, 1917.

The soil is a rich alluvium capable of

producing very heavy crops.

This colony, when fully developed, will consist of a central farm of about 200 acres and sixty small holdings of "mixed farming" type, averaging about thirty-five acres in extent. The equipment of each of the latter will include a comfortable cottage and the necessary buildings for working the holding.

The central farm will be under the man-

agement of a director, and will be equipped with machinery, implements, horses, etc., which will be let out on hire to settlers in need of them. It will in the first instance embrace the greater part, if not the whole of the estate, portions of which will be taken away from time to time for the formation or extension of the settlers' holdings.

Selected applicants will receive preliminary training in that they will work on the central farm under the supervision of the director, receiving wages until such time as they are considered capable of working a holding independently. They will then be allotted at a reasonable rental land near their cottages which, if of less extent than the average-sized holding above indicated, may be subsequently increased by further land taken from the central farm.

Applicants who are able to satisfy the Board that they have the necessary capital and experience may be allowed to take up holdings without preliminary training. Co-operative methods will be adopted for

the purchase of requirements and the consignment and disposal of produce.

It must be clearly understood that the government do not propose to make direct advances of capital to ex-service men desirous of taking up holdings, but it is hoped that industrious men, even if possessed of but little capital of their own, by starting as workers on the central farm and at the same time cultivating a small area on their own account, will gradually be able to increase the area under their own control until they are able to support themselves entirely from this source. Endeavours will be made to establish a system of co-operative credit to assist men of this class.

In the selection of settlers preference will be given, as between men of equal merit and qualifications, to those whose wives or sisters or daughters have, as the result of their employment on the land either before or during the war, acquired proficiency in milking or other farming operations.

INSTITUTION OF AN AUTONOMOUS MINISTRY IN ITALY

BY a decree of the General Lieutenant of the kingdom, dated 22 June 1916 (No. 755), and in response to a wish long expressed by Italian agriculturists, the Ministry of Agriculture, Industry and Trade was divided into two parts, of which one is concerned with agriculture and is called *Ministero per l'Agricoltura*, while the other is concerned with industry, trade and labour and is called *Ministero per l'Industria, il Commercio e il Lavoro*. To the new Ministry of Agriculture have been assigned the general and especial services having reference to agriculture, agricultural instruction, agricultural indus-

tries, vegetable pathology and zootechno-logy, to the forests, communal domains and public rights, and to agricultural statistics, mines, hydraulics and meteorology.

To the Ministry of Industry, Trade and Labour, on the other hand, there have been assigned the services having reference to trade, industry and industrial, commercial and professional instruction, to weights and measures and the assaying of precious metals, to property in ideas and to economy in general, and the services entailed by the inspectorates of industry and labour and by credit, social insurance and thrift, statistics and labour.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

IN addition to those already dealt with herein, the following is a list of the more important subjects treated in the three last numbers of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletins on application to the Institute Branch, so long as the supply for distribution is not exhausted.

NOVEMBER, 1916

	Page.
Boys' and Girls' Clubs in the United States . .	1-12
The Co-operative movement in New Zealand . .	
Agriculture	18-34

Agricultural Insurance in Switzerland	47-64
Providing Credit During Production in the United States	65-77
Results of Interior Organization in Finland	106-122

DECEMBER, 1916

The United States Federal Farm Loans Act	65-70
Land Settlement and the Provision of Credit in West Australia	98-103
Results of the New Agrarian Reform in Russia	116-131

JANUARY, 1917

Association of the Agriculturists of Spain	6-12
Mutual Funds for Insurance Against the Accidents of Agriculture	43-55
Land Settlement and Provision of Credit in Western Australia (concluded)	79-89
Forestry in the Kingdom of Serbia	114-122

AGRICULTURAL STATISTICS

INFLUENCE OF THE SEVERE WINTER UPON THE CROPS

THE cold wave which set in during January throughout Europe, bringing the temperature down to exceptionally low levels in many places has done damage to autumn sown crops and has considerably interfered with field work in that month. This is the chief feature in the reports published in the February number of the Bulletin of Agricultural and Commercial Statistics of the International Institute of Agriculture.

In France ploughing and sowing were perforce stopped, and nothing but the carting of fertilizers was accelerated by the abnormal temperature. In that country a noticeable decline in the area placed under cereals during the autumn of 1916 is reported. The wheat area on Jan. 1, 1917, was only 10,570,000 acres or 85 per cent of that sown at the same date in 1916; the area under rye was 2,046,000 acres (90 per cent) and that under oats was 1,610,000 (95 per cent). The only increase is in the area under barley, amounting to 10 per cent over that of 1916; this year's return is for 270,000 acres. The condition of autumn sown crops on Jan. 1st, 1917, was lower than that of the same date last year, for wheat, barley and oats, while for rye it was practically similar.

In Great Britain and Ireland heavy snowfalls with icy winds prevailed during the greater part of the month, and caused much retardation in field work. Still the crops that were above ground looked well in places where the snow was not lying, but were not sufficiently advanced for the time of year.

In Italy the weather was almost as inclement as in the other two countries mentioned. The condition of crops was an average one, but the preparations for spring sowing in North Italy had been inaugurated only in a few provinces. In the peninsula plentiful rains have been generally favourable to those preparations.

In British India, the sowing season for wheat has been favourable on the whole, in spite of too much rain in certain provinces, which however do not account for more than 25 per cent of the whole area under this crop. On the other hand the important rice-growing regions of Bengal, Bihar and Orissa (where about one-half the yield of British India is produced as a rule) have suffered from heavy rains and floods, causing injury which cannot be disregarded. In Japan, the sowing of wheat and barley has been slightly retarded by rains.

Passing to the countries of the southern hemisphere, where the cereal harvest of 1916-17 is now completed, it may be noted that Australia has modified previous es-

timates and now publishes the following figures: wheat, 148,478,000 bushels, or 100 per cent of the crop of 1915-16; rye, 134,000 bushels; oats, 19,530,000; barley, 4,190,000 bushels; maize 8,500,000 bushels.

The result is that the crops for 1916-17 of the two principal countries in the southern hemisphere (Argentina and Australia) reach only 220,870,000 bushels of wheat as compared with 315,657,000 in 1915-16, or 70 per cent of the last mentioned yield. By comparison with the average yield of the five years 1909-10 to 1913-14, this year's crop is only 92 per cent. The Report of the Director of Agricultural Statistics in Argentina, dated December 15, 1916, states that of the total area sown in 1916 with wheat, oats and linseed, amounting to 21,821,000 acres, there were 8,384,000 acres not harvested. These last figures had been much augmented, apart from actual crop failure caused by severe drought by the fact that the cultivators had frequently used the wheat and oats while yet green, as fodder for cattle. The area under wheat not harvested was 5,487,000 acres out of 16,089,000 acres, under oats 855,000 acres out of 2,525,000, and under linseed 2,091,000 out of 3,207,000 acres sown. There are no great changes observable in the results of the harvest of 1916 in the northern hemisphere.

As regards the potato crops the Bulletin of the Rome Institute, now under review, sums up the yields of France, Great Britain and Ireland, Italy, the Netherlands, Canada, the United States and Japan with a total of 1,053,200,000 bushels, against 1,218,792,000 bushels in 1915, and 1,339,594,000 bushels the average of 1909 to 1913, representing respectively 86 and 79 per cent of these two figures.

This is an unsatisfactory crop, especially considering that the cereal harvests have been by no means abundant, and that potatoes are consequently more in request than normally.

The agricultural portion of the Bulletin also includes estimates of the number of farm animals in some countries. In Great Britain and Ireland between June 1915 and June 1916 the number of horses increased from 1,984,088 to 2,108,445 or 6 per cent; cattle from 12,171,452 to 12,451,540 or 2 per cent; sheep, from 28,275,970 to 28,849,655 or 2 per cent; pigs decreased from 3,795,131 to 3,615,891 or 5 per cent. In the United States the number of horses decreased from 21,159,000 to 21,126,000, cattle increased from 61,920,000 to 63,617,000, sheep decreased from 48,625,000 to 48,483,000, while pigs decreased from 67,766,000 to 67,453,000.

THE WORLD'S TRADE IN WHEAT AND FLOUR

The figures are for wheat and flour together, flour being expressed in equivalent quantities of wheat at the rate of $4\frac{1}{2}$ bushels of wheat to one barrel of flour.

COUNTRIES	IMPORTS		EXPORTS	
	Year 1916	Year 1915	Year 1916	Year 1915
	Bushels	Bushels	Bushels	Bushels
Great Britain and Ireland.	212,405,000	192,466,000	2,623,000	4,101,000
Italy...	74,088,000	83,160,000	1,194,000	1,130,000
Sweden	9,470,000	9,939,000		
Canada	304,000	397,000	231,417,000	176,960,000
United States	9,404,000	5,149,000	218,736,000	276,396,000
Argentina			84,936,000	94,966,000
India	8,000	149,000	27,132,000	29,017,000
Algeria	2,000	1,298,000	3,195,000	5,062,000
Egypt	1,338,000	1,667,000	580,000	1,761,000
Tunis	193,000	1,158,000	461,000	613,000
Australia	9,000	7,384,000	55,986,000	1,475,000

THE WORLD'S SUPPLY OF CEREALS

THE spring edition of the six-monthly statistical notes published by the International Institute of Agriculture has just been issued at Rome, and a summary cabled to the Canadian Commissioner.

The total production of wheat in 1916 in twenty-eight countries, including Denmark, Spain, France, Great Britain and Ireland, Italy, Norway, Netherlands, Sweden, Switzerland, Canada, United States, India, Japan, Algeria, Egypt, Tunis, Argentina, Australia and New Zealand, which countries have sent official reports to the Institute, and Germany, Austria, Hungary, Belgium, Bulgaria, Luxemburg, Russia-in-Asia, Chili, and Uruguay, for which calculations have been made, is estimated to be 2,347,000,000 bushels, which is 72 per cent of the production of the same countries in 1915, and 83 per cent of their average production during the five years 1911 to 1915.

The carry-over of the 1915 crop remaining at the beginning of the commercial season—August 1st, 1916, for the Northern Hemisphere, and January 1st, 1917, for the Southern—amounted to 404,000,000 bushels, making the total available supply of wheat 2,751,000,000 bushels. The total normal consumption of these countries for the commercial year 1916-17 is estimated at 2,700,000,000 bushels, leaving, therefore, a surplus of 51,000,000. Consumption, however, is based on the average of the five years' 1911-15, and a normal increase of population, without taking account of

abnormal requirements, or the requirements of several tropical countries for which there are no statistics.

The total yield of foodstuffs in 1916 wheat and rye together—wheat in the nineteen countries mentioned above as having reported to the Institute, and rye in the same countries less Great Britain, India, Japan, Algeria, Egypt, Tunis, and New Zealand—was 2,523,000,000 bushels, or 74 per cent of the production of the same countries in 1915, and 84 per cent of their average production in five years. The carry-over of the 1915 crop in these countries at the beginning of the commercial season amounted to 409,000,000 bushels, making the total available supply of wheat and rye 2,932,000,000 bushels. The total normal consumption of these countries is estimated at 2,910,000,000 bushels, leaving, therefore, a surplus of 22,000,000 bushels.

The total production of fodder cereals—barley in seventeen countries, oats in sixteen, and corn in fourteen—is estimated at 4,908,000,000 bushels, 84.5 per cent of the crop of the previous year and 91 per cent of the five years' average. The carry-over of the 1915 crop in these same countries was 479,000,000 bushels, making an available supply of 5,387,000,000 bushels of fodder cereals. The normal consumption being 5,555,000,000 bushels, there is a deficiency of 168,000,000 bushels.

For the five cereals together there is therefore a deficiency of 146,000,000 bushels.

CROP CABLE FROM THE INSTITUTE

A cablegram received from the International Institute of Agriculture on April 22nd gives the following crop conditions for 1917:—

WHEAT.—Average for France, Italy, Switzerland and Egypt; mediocre for Great Britain and United States.

RYE.—Average for France, Italy, Switzerland, and United States.

BARLEY.—Average for France, Italy, Switzerland, and Egypt.

OATS.—Average for Italy and United States; mediocre for France and Ireland.

Forecast of the yield of winter wheat in the United States 430,000,000 bushels, 89.3 per cent compared with 1916, 97.5 per cent compared with the five-year

average 1909-13, and 79.8 per cent compared with the average for 1911-15. Yield of the 1916-17 wheat crop in Argentina, Australia and New Zealand totals 227,716,000 bushels, 68.4 per cent compared with 1915-16 and 93.1 per cent of the five-year average 1909-13. (The 1915-16 figures for Australia were changed in March from 143,000,000 bushels to 179,600,000). Yield of the 1916-17 oats crop in Argentina, Australia and New Zealand 55,868,000 bushels, 56.6 per cent of 1915-16 and 66.8 per cent of the average for the period 1909-13.

CORN.—In Argentina and Australia 67,340,000 bushels, being only 40.1 per cent of the 1915-16 crop and 33.4 per cent of the average for 1909-13.

NUMBERS OF LIVE STOCK

(LATEST OFFICIAL FIGURES)

COUNTRIES	Date of Enumeration	Horses	Cattle	Sheep	Goats	Pigs
Canada	June 30, 1916	2,990,635	6,489,864	1,965,101		2,814,672
	June 30, 1915	2,996,099	6,066,001	2,038,662		3,111,900
United States	Jan. 1, 1917	21,126,000	63,617,000	48,483,000		67,453,000
	Jan. 1, 1916	21,159,000	61,920,000	48,625,000		67,766,000
Great Britain and Ireland	June 5, 1916	2,108,445	12,451,540	28,849,655		8,615,891
	June 5, 1915	1,984,988	12,171,452	28,275,970		3,795,131
France	July 1, 1916	2,317,205	12,728,946	12,079,211		4,448,866
	July 1, 1915	2,227,200	12,286,849	13,483,189		5,490,796
Spain	1916	488,715	3,070,903	16,012,277	3,207,360	2,814,465
	1915	512,453	2,926,170	15,994,608	3,216,682	2,883,081
Denmark	Feb. 1916	515,415	2,289,996			1,983,255
	May 1915	525,690	2,417,125	593,034		1,918,627
Switzerland	Apr. 19, 1916	136,613	1,615,645	171,635	358,095	544,021
	Apr. 21, 1911	144,128	1,443,482	161,414	341,296	570,226
Norway	Sept. 30, 1915	185,217	1,120,517	1,329,559	240,303	208,522
	Sept. 30, 1914	182,432	1,146,274	1,326,850	236,805	228,117
New Zealand	Apr. 30, 1916			24,788,150		
	Apr. 30, 1915			24,901,421		
Tunis	Apr. 30, 1916	30,963	239,989	1,147,910	521,912	10,252
	July 31, 1915	31,929	269,152	1,119,310	499,164	12,255
Egypt	1916	34,403	492,650	687,696	263,200	8,580
	1915	35,015	553,632	755,421	290,218	7,259
Germany	Dec. 1, 1915	8,341,627	20,316,948	5,073,478	3,438,296	17,287,211
	Dec. 1, 1914	8,485,283	21,828,733	5,571,468	3,538,414	25,341,272

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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CONTENTS

	PAGE
The Suppression of Weeds.....	441

PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Agricultural Instruction Act	442
The Dominion Experimental Farms:—	
The Division of Field Husbandry:	
Conservation and Utilization of Farm Manure.....	445
Profitable Beef Production.....	445
The Entomological Branch:—	
The American Crow in Relation to Agriculture.....	446
Mr. Tom Wilson.....	450
Consulting Zoologist Appointed	451
The Live Stock Branch:—	
A Plan for the Assistance and Encouragement of Urban Poultry Keepers.....	451
Statement with Respect to the Loan of Rams and Boars to Farmers' Associations.....	452
The Seed Branch:—	
Germination Testing	454
Dominion Department of Agriculture Honour Roll.....	459
The Health of Animals Branch:—	
Regulations Relating to Tuberculosis	460
Poultry Diseases.....	461
Contagious Abortion, by F. Torrance.....	463
Record of Experimental Work in Contagious Abortion.....	464
The Fruit Branch:—	
The Apple Embargo.....	466

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Soil Surveys: —	
Nova Scotia.....	467
Ontario	469
Conservation and Utilization of Farmyard Manure:—	
The Nova Scotia Agricultural College.....	472
Quebec	473
Macdonald College	473
The Ontario Agricultural College.....	474
Manitoba.....	475
The University of Saskatchewan.....	475
Boys' and Girls' Club Contests:—	
Prince Edward Island.....	476
Nova Scotia	476
Macdonald College.....	477
Manitoba.....	479
Saskatchewan.....	480
Alberta	481
British Columbia	482
Quebec:—	
The Co-Operative Marketing of Lambs.....	483

Ontario:—	PAGE
Recent Agricultural Legislation.....	484
Women's Institute Workers in Conference.....	486
Manitoba:—	
Gopher Week.....	487
Recent Agricultural Legislation.....	487
Dairy Staff Appointments.....	490
Saskatchewan:—	
Agricultural Returns.....	491
The Better Farming Train.....	491
Encouraging Production of High Standard Milk.....	492
Farm Labour.....	493
Alberta:—	
The College of Agriculture.....	494
Professor of Field Husbandry Appointed.....	497
British Columbia:—	
The Dairies Regulation Act.....	498

PART III

RURAL SCIENCE

The School Inspector and Rural Science:—	
Nova Scotia.....	499
Ontario.....	499
Saskatchewan.....	502
Ontario:—	
Agricultural Instruction in Primary and Secondary Schools.....	507

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Acts Relating to Agriculture:—	
Legislation for Weed Control.....	508
The Honorary Advisory Council for Scientific and Industrial Research in Canada...	514
Associations and Societies:—	
The Dundas District Holstein Breeders' Club.....	516
The School Garden Association of Saskatchewan.....	516
The Alberta Horse Breeders' Association.....	516
The Alberta Hereford Breeders' Association.....	516
The Alberta Cattle Breeders' Association.....	517
New Publications.....	517
Notes.....	522
Index to Periodical Literature.....	524

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence.....	525
Science and Practice of Agriculture.....	525
Agricultural Economics:—	
State Hail Insurance in North Dakota.....	530
Syndicate for Mechanical Agriculture in France.....	533
Contents of the Institute Economic Bulletin.....	533
Agricultural Statistics:—	
Foreign Crop Conditions.....	533
Notes on the World's Cereal Situation.....	535

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OF CANADA

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THE SUPPRESSION OF WEEDS

IT is estimated that for every acre of land under cultivation or in pasture in North America one dollar is lost annually by the inroads of weeds. This would mean that Canada in this way sacrifices every year upwards of one hundred million dollars. It would be idle to suppose that the whole of this loss could be prevented. Weeds persistently revive and seeds are carried here, there, and everywhere by currents of wind, streams of water and channels of transportation. All that is possible, therefore, is carefulness in sowing and cultivation, in the first instance, and vigilance and diligence in suppression in the second.

In Part IV of the present issue of THE AGRICULTURAL GAZETTE is given a digest of the various laws that have been passed and are still in force in the Dominion having for their object the control of noxious or harmful weeds, for while a weed has in generic terms been described as a ~~plant~~ that grows where it is not wanted, there are distinct classes of weeds, harmful, less harmful, and, in suitable places, innocent or even useful. The laws seek to suppress those recognized as injurious or utterly undesirable.

While the measures passed by the provincial legislatures are all of a beneficial nature, THE SEED CONTROL ACT of the Dominion is without doubt the primary factor in ensuring good, clean crops—crops free from weed-seeds and other impurities. The object of the Act, as the title implies, is to protect the purchaser from buying and the sower from sowing any but seed that is reasonably, and, if possible, perfectly clean. The terms of the Act are drastic, but not more so than the importance of the subject warrants, seeing that the strict enforcement of its provisions means good food for the people and riches to the nation.

The Provincial Acts in their way are equally as insistent, but their main object is to protect the growing crops, while the Dominion Act begins at the very beginning of the subject in seeking to establish a guaranty of purity in seed. Having sown such seed, the price of success to both gardener and farmer is constant and never tiring watchfulness against the invasion of strange plants on the one hand and insects and disease on the other.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE AGRICULTURAL INSTRUCTION ACT

AS the years go round the good work performed under THE AGRICULTURAL INSTRUCTION ACT becomes more evident. The third annual report just issued makes this very plain. Consisting of 135 pages, it is replete with statistical tables and statements of the work that is being done under the Act. Instituted in 1913, the grants distributed among the nine provinces, according to population, in 1913-14 totalled \$700,000. Increased yearly by \$100,000, in 1914-15 they were \$800,000, in 1915-16 \$900,000, in 1916-17, \$1,000,000, and this year, or in 1917-18, \$1,100,000. As \$10,000,000 was to be distributed in ten years, the amount of the grants will remain at the last-mentioned figure until the expiration of the decade that is being covered.

The preamble of the Act states that its object is to give encouragement to agriculture through education, instruction and demonstration carried on along lines well devised and of a continuous nature. Provision is made that the methods of expenditure must be submitted each year to the Federal Minister of Agriculture for approval. This is done through the Commissioner under the Act, who up to the time of his death last June was Charles Caniff James, C.M.G., M.A., LL.D., F.R.S.C., and is now W. J. Black, B.S.A.,

formerly Deputy Minister of Agriculture for Manitoba and President of the Agricultural College in that province.

THE CLASSIFICATION

The present report is for the year 1915-16. As the fiscal year ends March 31st, the work described was performed within the period of the late Dr. James' term of office, but the report was prepared by his successor. The various allotments and the uses to which they were to be put were given in THE AGRICULTURAL GAZETTE of July 1915, Vol. II, page 619-623 and were all duly so applied. The principal headings under which they came, as given in the report, are:

Agricultural Colleges and Schools—comprising buildings, equipment and furnishings, described as capital expenditure, salaries, expenses of maintenance, instruction, college extension research. For these purposes the provinces appropriated a total of \$262,213.

Instruction and Demonstration—including salaries of instructors, inspectors and superintendents and all or part expenses connected with District Representatives, short courses, demonstration farms, demonstration trains, demonstrations in soil and drainage, instruction in hor-

ticulture, including fruit and vegetable growing, instruction in co-operation and marketing, in live stock raising, in dairying, in poultry and bee-keeping, in the cultivation of field crops, in seed improvement, in boys' and girls' work, in meat curing and abattoir work, in maple products, in fruit canning and for institute lectures, investigations and competitions. To this work a total was devoted of \$476,785.

Elementary Agricultural Education—comprising training of teachers, household science, school gardens and various grants for publicity and so on. This took a total of \$91,491.

Women's Work—such as institute organization, domestic science courses and so on. A total of \$23,890 was used in this way.

Publicity—including printing and publication of bulletins, reports and other forms of the work. In this way \$14,800 was used.

Miscellaneous—\$10,419.52.

In giving these totals it should be premised that the methods of appropriations adopted were not alike in all the provinces. For instance, in Alberta the schools of agriculture give instruction in household science and the sum so applied comes under the heading of agricultural colleges and schools. In British Columbia women's work is charged to miscellaneous. In Quebec, women's work is provided for in English-speaking districts out of the Macdonald College grant, which comes under colleges and schools, and again, in Quebec, the cost of publications is credited to instruction and demonstration. Sufficient, however, is here shown to indicate the uses to which the funds provided under the Act are put, and to prove the valuable asset to the country that is being accumulated. All the appropriations are worked out in exact detail in the report.

OFFICIALS DIRECTLY PAID

A striking feature of the report is a table showing the number of officers of the different provinces paid wholly, or in part, out of funds derived from the Dominion grant. These number 315, who were paid, entirely or in part, with \$305,135 thus derived. In Ontario there were 68 thus remunerated at an expense of \$62,000; in Quebec 84 with \$57,000; in Manitoba 23 with \$29,120; in Saskatchewan 24 with \$40,100; in Alberta 32 with \$45,220; in British Columbia 17 with \$19,380; in Nova Scotia 33 with \$16,735; in New Brunswick 18, wholly, with \$24,700, and in Prince Edward Island 16, wholly, with \$16,880. Thus was a large staff of experienced agricultural teachers added to each of the provinces by means of the grants.

PRINCIPAL PURPOSES

It is interesting to note the principal uses to which the provinces individually apply the grants. Ontario, for instance, devoted \$114,000 to the payment of District Representatives in 1915-16, making \$294,000 so applied during the three years dealt with in the reports so far issued; \$81,413 to new buildings for the Ontario Agricultural College in 1915-16, making \$209,913 so used in the three years in addition to sums devoted to salaries and maintenance, and \$20,000 to the expenses incurred in the teaching of agricultural and domestic science in the high, public, separate and continuation schools. Quebec, in 1913-14, devoted \$59,850 and \$60,000 in each of the two succeeding years to schools of agriculture; \$25,000 in 1915-16 to dairying, as compared with \$7,000 and \$17,000 respectively in the two preceding years; \$33,000 in 1915-16 to arboriculture and fruit-growing, against \$15,919 and \$20,000 in the two preceding years; \$12,000 in 1914-15 and in 1915-16 to District Representatives, and \$10,000 in 1913-14, and \$15,000 to poultry in 1915-16

and \$16,000 in each of the two preceding years. Manitoba devoted \$27,000 in 1915-16 to instructors, directors, and District Representatives and \$20,000 to instruction and demonstration (short courses). Saskatchewan devoted \$22,800 in the same year to the College of Agriculture and \$27,600 to directors, superintendents and District Representatives. Alberta devoted \$38,000 in 1915-16, \$31,500 in 1913-14 and \$42,000 in 1914-15 to the maintenance, equipment and building improvement of the schools of agriculture, being \$111,500 in the three years. In 1915-16, British Columbia apportioned \$10,000 to inspectors, instructors, directors, superintendents and District Representatives, \$18,000 to farm demonstration and experimental work, and \$15,000 towards agricultural instruction in the public, normal and high schools. Nova Scotia in the same year devoted \$27,500 to the agricultural college and school and \$19,500 to demonstration, investigation and short courses. New Brunswick al-

lotted \$10,000 to agricultural schools in 1915-16, \$18,000 to instructors, directors and superintendents, and \$10,000 to agriculture in schools. Prince Edward Island's largest expenditure under the Act for the year covered by the report was \$11,791 for agricultural instruction in public and high schools.

Each province annually devotes a fair proportion of the grants received under the Act to the promotion of women's work, to household science and the encouragement of women's institutes, Ontario having so utilized \$38,000 in the three years, Quebec \$27,000, Manitoba \$16,000 and so on.

It will be understood that the uses to which the appropriations are put vary to some extent from year to year and that the classifications, by the provinces differ. Portions of the grants are in instances entrusted to the Departments of Education to administer, although greatly the larger bulk is expended by the provincial Departments of Agriculture.

I take the liberty of addressing this word to the farmers of the country and to all who work on the farms: The supreme need of our nation and of the nations with which we are co-operating is an abundance of supplies, and especially of food stuffs. The importance of an adequate food supply, especially for the present year, is superlative. Without abundant food, alike for the armies and the peoples now at war, the whole great enterprise upon which we have embarked will break down and fail.

The world's food reserves are low. Not only during the present emergency but for some time after peace shall have come both our own people and a large proportion of the people of Europe must rely on the harvests in America.

Upon the farmers of this country, therefore, in large measure rests the fate of the war and the fate of the nations. May the nation not count upon them to omit no step that will increase the production of their land or that will bring about the most effectual co-operation in the sale and distribution of their products?

The time is short. It is of the most imperative importance that everything possible be done and done immediately to make sure of large harvests. I call upon young men and old alike and upon the able-bodied boys of the land to accept and act upon this duty—to turn in hosts to the farms and make certain that no pains and no labour are lacking in this great matter.—*From appeal of President Wilson.*

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF FIELD HUSBANDRY

CONSERVATION AND UTILIZATION OF FARM MANURE

BY W. L. GRAHAM, B.S.A., ASSISTANT DOMINION FIELD HUSBANDMAN

ALL investigations go to show that farm manure has its greatest value when fresh, that the liquid portion is richer than the solid material and that the former is more readily lost through drainage and leaching. Hence it is that every precaution is taken here to have a minimum loss of plant food constituents in the manure and is the main reason for applying manure to the land, where practicable, as quickly as possible after it is produced.

At the Central Farm, Ottawa, the liquid manure is absorbed by means of litter, usually cut straw, and as each load of mixed liquid and solid manure is gathered it is taken directly to the field and is spread on the land either by hand or by means of the manure spreader, as convenient. This method is carried on consistently throughout the year although during occasional winter seasons this system may be interrupted for a time due to the depth of snow or other causes. The contour of the land at this farm which varies from fairly level to gently rolling lends itself

admirably to the foregoing plan of procedure.

The manure is always applied systematically in definite cropping systems or crop rotations. The amount and frequency of application vary according to the duration of the rotation, but, without exception, in the regular farm rotations, six tons of fresh manure are allotted to each year of the rotation. For instance, in a three-year system, of hoed, grain and hay crops, eighteen tons of manure are applied for the hoed crop. In four-year rotations twenty-four tons is the amount applied. For a five-year rotation the amount is thirty tons of which fifteen tons are applied for the hoed crops and the balance is spread in lighter dressings for the clover and timothy hay areas.

Where the manure is being applied for cultivated or hoed crops the importance of incorporating the manure thoroughly with the soil as near to the surface as practicable is closely observed.

PROFITABLE BEEF PRODUCTION

IN an experiment at the Experimental Farm at Nappan in feeding good stockers, heavy fed v. light fed, eight steers were selected, in such condition that they could be classed as good stockers. These were dehorned and fed a preparatory ration for a few weeks previous to starting the test, in order

to get them accustomed to their feed and surroundings, then divided into two lots of four each. The four heavy fed, or Lot 1, were given 50 per cent more roots and meal than were the four light fed, or Lot 2. Number of days in test 93; total weight at the beginning for Lot 1, heavy fed, 4573 pounds; at finish,

5295 pounds, an increase of 722 pounds. For Lot 2, light fed, at beginning 4206 pounds; at finish 4880 pounds, an increase of 674 pounds.

The original purchase price was 6¼c. per pound, live weight. The selling price was 8.1c. per pound. The gross profit for Lot 1 was \$143.09; for Lot 2, \$132.40. The total cost of feed for Lot 1 for 93 days was \$99.16; for Lot 2, \$75.29, leaving a net profit for Lot 1 of \$43.93, or a profit per steer of \$10.98; for Lot 2, a net profit of \$57.11, or per steer \$14.28, a difference of \$3.30 per steer in favour of the light fed.

The average profit per steer for three years, over and above the cost of feed at market prices, was, for Lot 1, \$16.06; for Lot 2, \$18.05, a difference of \$1.99 per steer in favour of the light fed. The average cost

for three years to produce 1 pound of gain was 11.08 cents in the case of heavy fed and 9.57 cents for the light fed. The ration fed to Lot 1 at the beginning of the period was 60 pounds roots, 6 pounds meal, 1 pound molasses. At the finish 40 pounds roots, 16.5 pounds meal, 2 pounds molasses. For Lot 2 at the beginning 40 pounds roots, 4 pounds meal and 1 pound molasses; at the finish 30 pounds roots, 11 pounds meal and 2 pounds molasses. The meal mixture was made up of 200 pounds of ground oats and barley (equal parts by weight), 200 of bran, 50 of oilcake, 50 of cotton seed.

The meal mixture cost \$1.50 per hundredweight; roots were valued at \$2 per ton; hay at \$8 per ton; and molasses 20c. per gallon.

THE ENTOMOLOGICAL BRANCH

THE AMERICAN CROW IN RELATION TO AGRICULTURE

BY NORMAN CRIDDLE, DOMINION ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

THE crow is a bird that requires no introduction to the farmers of Canada. Colour, size and habits give it a distinctiveness for which no other bird can be mistaken. It is distributed over all the semi-wooded areas of the country, being a permanent resident in Eastern Canada and a summer visitor only in the prairie provinces.

There is something fascinating about the crow which makes it difficult to consider it from the material economic standpoint, which, unfortunately for the subject, is required in these days. To begin with we can see that the bird possesses unusual abilities among the feathered tribe. Note its many calls, all undoubtedly signifying distinct things. See how it learns to recognize its friends from foes. Man it distrusts, and rightly so, yet when they are not molested these same crows become

comparatively tame. There is a pair about my home at the present time which have nested close at hand for the last three years and showing no indication of becoming robbers are permitted to drink at the horse trough or walk among the poultry. There is also a wisdom in these birds' general habits which gives them a distinction possessed by few other birds. They are as mischievous as a jackdaw when kept in captivity and in nature have an inquisitiveness which causes them to be always on the look-out for what others are doing. Man is one whom they seem never weary of watching and it is seldom that a man remains long in one place without a crow going to see what he has been doing when he leaves. Perhaps one of the most interesting traits of crows is their answer to the call of battle; whether this is in substance

universal military service I do not pretend to say, but the fact remains that the call of a single pair will soon draw together all the male crows in the neighbourhood, as well as a large percentage of the females, which only return to their own nests when

ested. Should they do so they will learn many things worth while, among others that insects are as much titbits to the crow as eggs are and that they are procurable throughout the entire summer, whereas eggs are limited, in nature, to a couple of



THE AMERICAN CROW

the danger they were called upon to combat is past.

It would far outrun the limits of this article to state one-quarter of the interesting habits of these birds. I have mentioned those above in the hope that others may become inter-

months.

It is not necessary to refer to more than the general breeding habits of crows. We all know that they have but one brood annually and that the nest is built in a tree. We also know that the five or six young are nearly

always reared to maturity. In their family life the crows are exemplary in all their proceedings. Both birds share in building the nest and during the actual brooding, when the female seldom leaves the nest, the male undertakes the double duty of feeding and defending her. Thus in due course the young reach maturity and in August gather into large flocks. In this condition they remain for the rest of the season, generally roosting together at night and breaking up into several parties during the day, when they sometimes fly long distances in search of food. At the approach of winter many individuals move southward. In the prairie provinces all go, while in the east a certain number remain, living upon various native fruits, discarded apples, grain and such other food as is available.

There is probably no bird that has been more generally condemned by the public than the crow and I have little doubt that fully ninety people out of every hundred would subscribe to such an opinion, fully believing themselves to be right. This, I think, is largely due to the fact that its misdeeds are mostly of a prominent nature and easily observed, while its benefits pass unnoticed. Thus a crow carrying off a young bird is apt to attract attention; there will be the cries of the parents or perhaps the nestlings are known, whereas the same crow might pick up thousands of noxious insects without any one being any the wiser; indeed its presence would probably lead to its being accused of some fresh atrocity. And so, no matter how a nest is ravaged—be the offender cat, dog, coyote, skunk, squirrel or hawk—if there is a crow in the neighbourhood he is the thief without doubt, and another cry goes up about his iniquities.

There is another point that is either overlooked or ignored by those condemning crows. As I have pointed out above, these birds make a practice of watching mankind, being

probably on the look out for food. Thus a man visiting another bird's nest is more often than not seen by a crow, moreover, he disturbs the brooding bird in broad daylight. Thus, there is every chance of the crow discovering the nest. Compare these artificial conditions with natural ones and we see at once, that they are totally dissimilar. An excellent illustration of this has been supplied by a violent anti-crow advocate from whose statement the following is taken: "I have watched Mr. Crow for many springs and I find him getting more and more numerous and hungry every year. I have found prairie chickens and grouse nests and *marked them to keep watch* and found that the crow got two out of every three before hatching." He goes on to speak of a blue-jay's nest. "I watched and passed this nest two or three times every day. When almost ready for hatching I heard a great commotion in Jayville and found the nest robbed by Mr. Crow." The italics are mine. Almost all the arguments as to crow habits follow this line of reasoning.

THE INJURY DONE BY CROWS

In Eastern Canada and throughout the corn belt of the United States the chief complaint against crows is that they destroy much sprouting corn for which they soon acquire a taste, thus not only causing severe loss, but necessitating the treatment of the seed with a tar preparation as a deterrent. In Western Canada, however, we have not as yet suffered to any appreciable extent from injury of this nature, due doubtless to the comparatively small amount of corn grown. With reference to the destruction of other cereals, this is chiefly confined to grain in the stook when large flocks of crows make a habit of visiting certain fields daily. The injury, however, is not usually as severe as might be expected, owing to the fact that the birds really pick up a large pro-

portion of this grain from the ground and use the stooks more as an eminence from which to view the surrounding country for possible enemies. That this is so may be judged from crows similarly perching upon haycocks. Another reason for resting upon both is that grasshoppers collect there.

We have already touched upon the question of crows in relation to wild bird eggs. Apart from this, however, these birds are also accused of destroying the eggs of poultry, as well as young chickens. There is of course some truth in this, though there is nothing to warrant the belief that this loss is very extensive. Eggs are naturally not taken when the hens are provided with decent nests. The chief loss of young chickens is when they are reared in incubators and so have no hen to take care of them. Personal experience of over thirty years shows that it is only occasionally that crows learn to visit systematically the poultry yard for the purpose of attacking poultry. Evidence also points to the habit being often acquired through the careless practice of throwing out bad eggs or dead chickens, instead of burying them. By this means the crow acquires a taste for them and from taking the dead it soon learns to attack the living. When a crow takes to this habit a gun is the only remedy. But an occasional robber of this kind does not necessarily prove that all others are such. Lastly we may add to the activities of the crow the fact that it destroys some useful insects and also frogs, toads and snakes, all of which are usually beneficial.

THE VALUE OF CROWS

It is common knowledge to every farmer that crows are constantly in attendance behind the plough, cultivator or harrow, not, as has been claimed, to pick up the seeds, but to feed upon the various larvæ such as cutworms, wireworms, and white

grubs that are exposed, especially the last two pests. I have seen white grubs in heavily infested fields reduced more than fifty per cent by the aid of crows, and as these grubs are almost impossible to destroy in other ways, the value of crows in this respect is of considerable importance. Cutworms are also located among the growing crops and eaten in large numbers. Indeed to observe a flock of crows constantly returning to the same area in a field is strong evidence that there are cutworms or some other noxious insect present. A remarkable example of how crows sometimes aid farmers was witnessed near Treesbank, Manitoba, in September, 1915. There was a destructive outbreak of army-worms at this time, which having eaten all the available vegetation in the close vicinity were marching over a roadway in enormous numbers to attack a field of oats. Here it was that the crows found them and soon caused a very appreciable reduction in their numbers. This flock of crows which was estimated at 3000, had previously been frequenting a locust-infested area which they speedily forsook for the more palatable army-worms, with which they remained until these larvæ pupated and even then many pupæ were located beneath clods of earth and devoured. It is interesting to know that in this instance the crows were at first actually suspected of some mischief by the farmer chiefly concerned, though later when their real object was pointed out this farmer could not say too much in favour of the crows. Apart from their value as destroyers of noxious insects, crows also kill mice and young rabbits. Add to these their habit of devouring offensive carrion and we have reviewed the chief points of the birds' usefulness.

It is well known that crows, like many other birds, disgorge all undigested food in the form of pellets. Thus by visiting a meeting place or roost many of them can be gathered up and examined. Naturally

the softer substances, such as cut-worms, are not present, but this does not prevent some useful information being secured. A number of crow pellets were gathered by the writer in September, 1915, at a time when the crows were visiting the grain fields very regularly. An examination of these revealed the following substance: 92 per cent contained grain, chiefly oats, among which were some wild ones. Judging from small bits of charcoal these had been largely gathered from burnt over stubble fields of which there were several in the vicinity. All but four pellets showed grasshopper remains and three were literally a jumbled up mass of those insects, fourteen hind-legs being found in one small pellet, all belonging to the genus *Melanoplus*, which contains our most destructive species. Two pellets contained parts of mice. Another showed bits of frog bone as well as crayfish remains. Beetles were found in nearly all, consisting largely of ground beetles, (*Carabidæ*). Small stones, coal and sand constituted the balance of these pellets. Of all this matter about 74 per cent was grain, which is to be expected when we take into consideration the time of year, and realize that most of our insect pests are over for the season.

SUMMARY

We have seen by the evidence provided above that the crow cer-

tainly does some harm and that this is especially so in the corn belt. It also destroys a certain number of eggs and young of both domestic and wild birds. Grain too is eaten in the autumn and while this is not always taken from the sheaves, a portion of it undoubtedly is, and there are occasions when crows do considerable harm in this way, and when they occur in large numbers some reduction in numbers is desirable. On the other hand the bird is undoubtedly of value as a destroyer of noxious insects and, in this respect, seems to fully compensate for the harm it does at other times. When we add to these useful activities the killing of mice and removing carrion, there appears to be a balance of usefulness in the crow's favour. There are certain districts such as those in the vicinity of small lakes or ponds where ducks breed, where the reduction in the number of crows is advisable. They, however, are only a minor factor in game destruction. Care in avoiding any disturbance to the birds and above all in protecting them from prairie fires would accomplish infinitely more than the destruction of crows.

In conclusion it may be pointed out that the evidence given above has been fully verified through the examination of crow stomachs by the United States Biological Survey, a number of which were collected near the writer's home in Manitoba.

MR. TOM WILSON

IT is with deep regret that we have to record the death of Mr. Tom Wilson, Inspector of Indian Orchards, and the oldest officer, by length of service, in the Entomological Branch. Mr. Wilson was burnt to death on March 6th, 1917, in the Quahalla Hotel fire at Hope, B.C., while travelling on official duties. He was appointed Superintendent

of Fumigation at Vancouver, B.C., on the establishment of the fumigation stations in 1900. In 1906 he undertook the additional duties of Inspector of Indian orchards. Since 1912 he had devoted his whole time to the work in the Indian orchards, of which a full account was given by him in THE AGRICULTURAL GAZETTE, Vol. 3, No. 10, October, 1916, pp.

856-860. He succeeded to a remarkable degree in stimulating an interest in fruit growing and horticulture among the Indians. His knowledge of the flora of British Columbia was unequalled, and always a keen ob-

server he did much to promote entomological and botanical work in the province where he was widely known and where his tragic death has been keenly felt.—C. G. H.

CONSULTING ZOOLOGIST APPOINTED

By Order-in-Council dated 10th April, 1917, the title of Consulting Zoologist was given to Dr. C. Gordon Hewitt in addition to his present title of Dominion Entomologist.

The order states that "the duties of the office shall be to advise in matters relating to the protection of birds and mammals and the treatment of noxious species".

THE LIVE STOCK BRANCH

A PLAN FOR THE ASSISTANCE AND ENCOURAGEMENT OF URBAN POULTRY KEEPERS

THE present year will see a great increase in the number of urban poultry keepers. The almost prohibitive prices of eggs and poultry during the past winter have caused many consumers to seriously consider the home production of these very necessary and useful commodities. It is important also that any efforts put forth in this direction result satisfactorily.

Many difficulties present themselves in attempting to rear chickens successfully on a small city lot. Experience has shown that the best way for urban poultry keepers to enter the poultry business is by the purchase of pullets in the fall. Well-matured pullets are the most reliable winter egg producers and if well cared for will not only produce plenty of fresh eggs for the breakfast table but also return a reasonable profit on the expenditure entailed.

PLAN PROPOSED

Ordinarily, well matured pullets are rather scarce and difficult to obtain in the fall of the year. It is

believed, however, if the matter were taken up systematically by poultry associations that the difficulty could be overcome, and, incidentally, serve as a means of increasing interest in the poultry industry. Practically every large town and city has its local poultry association. It is suggested that each association give some publicity to the suitability of thrifty, well matured pullets for profitable winter egg production and advertise the fact that the association is prepared to constitute itself a medium to arrange for the hatching and rearing of pullets this spring and for their delivery in the fall. It could be announced that orders would be taken during the month of April and the first part of May. All those desiring pullets in this way could be required to join the association and make a small deposit covering the number required.

The association could then make such arrangements as might be necessary with nearby co-operative associations, farmers and breeders for the growing of the pullets, a minimum price to be decided upon

for the different breeds and varieties. In the fall these could be assembled at some central depot in each locality and the distribution made in time to permit of the proper housing of the stock in permanent winter quarters before the severe weather set in, say by the last of October.

FEDERAL ASSISTANCE

In order that greater effectiveness may be given to this proposal, the Dominion Live Stock Branch is prepared to extend, to all associations qualifying under these provisions, the same assistance that is given to associations desiring to purchase other kinds of pure bred live stock, namely, the payment of reasonable travelling expenses, during the time required to conclude the purchase and transport the stock to destination, of representatives of associa-

tions, in any section of Canada, desiring to purchase pullets in lots of 300 or more. Should it be desired, the Live Stock Commissioner will also nominate a suitable person who will be directed to accompany this representative and assist him as far as possible in the selection and shipping of the pullets.

In the general interests of the poultry industry throughout the Dominion and the urgent need this year for increased production of eggs and poultry and the releasing thereby of a large surplus for export to Great Britain, it is hoped that as many associations as possible will take advantage of this proposition. All associations desiring to become active in this direction are requested to communicate with the Live Stock Commissioner, Ottawa, at once for further advice and instruction in the matter.

STATEMENT WITH RESPECT TO THE LOAN OF RAMS AND BOARS TO FARMERS' ASSOCIATIONS

BY T. REG. ARKELL, B.S.A., B.Sc., IN CHARGE OF SHEEP DIVISION

THE policy of loaning pure-bred sires to farmers' associations has now been in operation four years. Assistance of this nature is confined to districts where the farmers have difficulty in securing well-bred sires, or are in financial circumstances which restrict their ability to purchase the most suitable type of breeding male. In pursuing this work, it has been the purpose of the Branch to limit an association to a single breed and advise persistent use of the original selection. Adherence to this system by societies has already shown results of the greatest benefit in fostering not only a keen desire amongst members to produce a better class of live stock but in creating, as well, a uniform type within a district.

Live stock breeding in Canada has never conformed to any distinctive standard. The farmer would, in many instances, switch from one type to another radically different without assuring himself whether the change would be advantageous or not. Not infrequently this caused undoubted injury and produced a disordered condition which was not wholesome.

An advance toward the establishment of the community system of breeding, which obtains so satisfactorily in Great Britain, is a direct result of this policy of the Branch.

In the following tabulated statement is shown the number of rams and boars distributed during the past four years:

BOARS LOANED TO ASSOCIATIONS OF FARMERS DURING 1913-14-15-16 BY THE LIVE STOCK BRANCH, OTTAWA
CORRECTED TO JANUARY 1ST, 1917

BREED	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
Yorkshire.	'13 '14 '15 '16 '17 2	'13 '14 '15 '16 '17 3 6 1	'13 '14 '15 '16 '17 3 1	'13 '14 '15 '16 '17 29 56 14 8	'13 '14 '15 '16 '17 8 5 3	'13 '14 '15 '16 '17 5 2	'13 '14 '15 '16 '17 12 12	'13 '14 '15 '16 '17 11 6 2 1	'13 '14 '15 '16 '17 1 2	'13 '14 '15 '16 '17 71 90 21 11
Berkshire.	5	1	1	1 3 5 7 2 2 10 5	1 15 18	8 1	3 4	9 3 4 1 1 1	3 1 1 3 69 46 6 9	
Poland China.					1			2 2	2 1 8 3 4	
Duroc Jersey.				1 11 13 7 3		1			1 14 8 4 2	
Chester White	3 2	1	1	2 1 1		1 1	1	1		7 13 14 8
Tamworth										1 4 2 1
Total	5 2 1	7 8 1 1	3 2 1	30 69 29 19	17 12 5 2 16 8 1	1 30 43 1	51 22 9 4	4 2 2 8	163 168 50 35	

RAMS LOANED TO ASSOCIATIONS OF FARMERS DURING 1913-14-15-16 BY THE LIVE STOCK BRANCH, OTTAWA
CORRECTED TO JANUARY 1ST, 1917

BREED	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	Total
Shropshire	'13 '14 '15 '16 '17 28 '30 '28	'13 '14 '15 '16 '17 19 24 21 '36	'13 '14 '15 '16 '17 6 16 1	'13 '14 '15 '16 '17 18 133 40 38	'13 '14 '15 '16 '17 2 20 3 5	'13 '14 '15 '16 '17 5 2	'13 '14 '15 '16 '17 2 1 3	'13 '14 '15 '16 '17 1 12 8 33 29	'13 '14 '15 '16 '17 1 88 234 131 112	'13 '14 '15 '16 '17
Oxford Down.	17 12 3 38 53	77 41	9 1 2	5 30 25 26	3 4 1	11 3 6 7	1 1	1 24 26	1 66 115 148 104	
Leicester	5 6 4	8	1 8 5	8 55 86 113	16 18 9 11	1 1 1	2 1		26 80 111 142	
Cheviot	4 1	4	3	4 2 10					8 5 2 13	
Southdown	4 2	3 2 11	1	3 6 1 2	1 1				7 13 4 20	
Hampshire.			4	2 1 3 8 20 30					7 8 22 31	
Lincoln.				3 3 1 8 2					3 1 8 5	
Suffolk					2	3 3			3 3	
Cotswold				1						3
Total	36 55 46 10 61 85 100 96	19 19 13 12	40 237 183 221	21 43 16 16	16 4 15 10	3 4 2 1	12 9 57 55	6 208 456 432 427		

THE SEED BRANCH

GERMINATION TESTING

BY H. B. SIFTON, B.A., ASSISTANT SEED ANALYST

SEEDS are resting stages in the development of plants. They are especially adapted for retaining life under adverse temperature and moisture conditions. By means of them, plants spread from place to place, and fragile forms are tided over our northern winters and the dry seasons of the south. A supply of food material is always present for the support of the plant while it is producing its first roots and leaves.

A period of "after-ripening" occurs in many species, though not in all, during which the seed remains apparently inert, no matter what its surroundings.

The length of this resting period differs in different species, and, when it is finished, the seed is ready as soon as it meets proper conditions to begin its growth into the green plant. This beginning of growth is germination.

In order to germinate, seeds in general require to be supplied with moisture, air and heat. For each variety there is a range of temperature and moisture within which germination and growth can take place, and each has one definite set of conditions which is best for the exercise of these functions. The strongest seeds will produce plants under any conditions within the limits specified. Weaker ones have a smaller range, and the weakest of all must have optimum conditions if they are to give satisfaction. It is very rarely that an ideal set of conditions is found in nature, and so it is important in choosing seed to ascertain not only that it is alive and will grow, but also that it is strong

enough and sufficiently supplied with food material to produce healthy plants when sown.

The Seed Control Act bases its standards on the percentage of germinable seeds, because their vitality cannot be expressed except relatively. For the same reason the regular reports of the germination laboratory give only the number of seeds which sprout. Our aim is to place the seeds under conditions as nearly ideal as possible and thus ascertain the percentage which are alive. The strength of plants which they will produce is to be determined by watching the rapidity with which they grow and the vigour and lustiness of the sprouts. For this reason, while many samples are tested as described above much more satisfactory results can be obtained by testing seeds at home than by trusting entirely to a laboratory report.

The germinators used in the laboratory are of two types, as illustrated in the accompanying figures. The first kind, shown in Fig. I and Fig. II, is used in the great majority of tests. All the walls are composed of plates of copper three inches apart, the space between being kept filled with water, which facilitates the maintaining of an even temperature. The doors also are made of two layers either of glass (Fig. I), or of copper (Fig. II), with a dead air space between to prevent a rapid loss of heat. Ventilating pipes enter at top and bottom, and when the germinator is warmed a slow current of air is constantly passing through, entering at the bottom, becoming warmed, and slowly escaping at the top. Heat is supplied by electric heating units

either enclosed in the water jacket of the floor or placed just beneath it.

The interior of the germinator is filled with perforated metal trays which slide in, one above the other, two inches apart. At the top and bottom are open pans of water which

keep the air moist. A cotton wick passes from one pan to the other down the back of the germinator and is kept constantly wet by capillarity. When in use the trays are covered with a layer of moistened blotters, and this layer, pressing

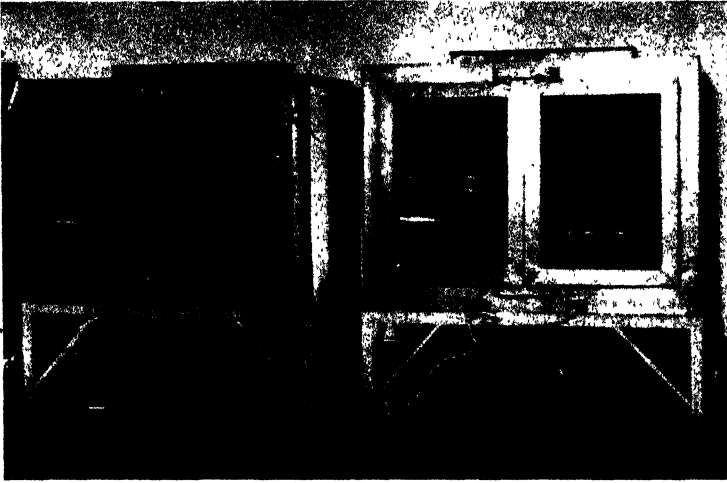


FIG. I. LARGE GERMINATORS
The trays of samples show through the glass doors

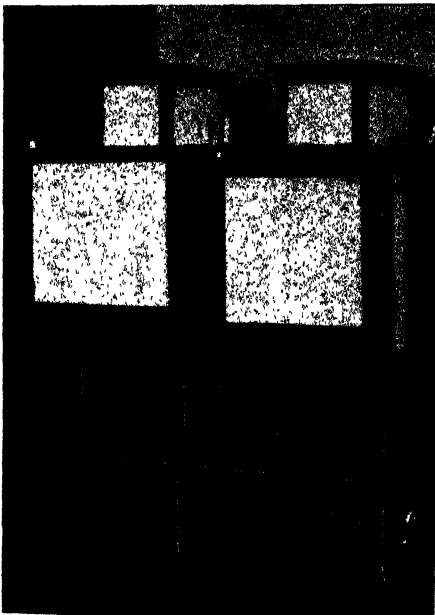


FIG. II. STANDARD DARK GERMINATORS

against the cotton wick, draws water from it and is kept moist throughout the test.

Samples to be tested are spread out on other moistened blotters which are then folded together like two leaves of a book, and arranged on the trays. Duplicate tests are made of all samples, one hundred seeds being ordinarily used for each test. Of the larger seeds, such as peas and beans, smaller numbers are taken, and for these folders of canton flannel or of flannelette have been found to give better results than blotters. Sprouted seeds are counted, recorded and removed at intervals which differ for different varieties.

Fig. III shows the Hamburg type of germinator, used for seeds which germinate better in the light, or in sand or soil. The bottom of this germinator has a pan of water in which the heating coils are immersed, and into which dip the perforated

bottoms of pans filled with clean sand, which is thus kept moist. On this sand are placed the seeds, spread on top of blotters, or sown in earthen dishes or paper trays, filled with sand or soil.

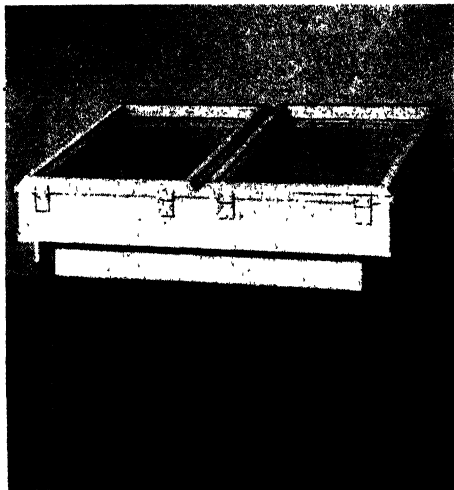


FIG. III. HAMBURG GERMINATOR
The hinged glass top serves as a door and also for the entrance of light

Our common farm seeds fall naturally into two divisions, high temperature and low temperature seeds. The former belong for the most part to plants not thoroughly hardened to our cool springs and autumns, and are sown late in the spring when the ground has become warm. In the laboratory the germinators used for them are heated up to 85 degrees F. each day. At night they are allowed to cool to 68 degrees F. Better results are given by thus alternating the temperature in imitation of natural conditions. Low temperature seeds are hardier, and for them the temperature is kept at from 65 degrees to 68 degrees F.

HIGH TEMPERATURE SEEDS

Of high temperature seeds, *corn* deserves first place from the standpoint of this article. It is grown extensively in Ontario and Quebec, and to a smaller extent in some of

the other provinces, and to ensure a good stand should always be tested before planting. When immature the seed is very easily injured by frost, and after harvest, if not thoroughly dried and well cared for, it loses rapidly in vitality. The appearance of the seed is sometimes an indication of its quality, but in many cases one may be misled and the importance of a germination test cannot be too strongly emphasized. Fig. IV shows the result of a soil test on two lots, both of which had the appearance of good seed. The superiority of the lot to the right, both in percentage of germination and in the vigour of the seedlings produced, is at once apparent. While the first named difference would be indicated by a germination report from the laboratory the latter could only be obtained by observations, the recording of which is impracticable where thousands of tests must be made during a season. The advisability of testing one's own seed at home in the method described below is very clearly shown by these facts.

Seed corn may be bought on the ear, or shelled ready for planting. While shelled corn is still bought by the majority of farmers, that on the ear is rapidly growing in favour in spite of the extra price due to the greater cost of transportation. Its advantages are evident. The buyer can assure himself that it is a good type of the variety he desires, he can discard the irregular kernels of the butt and tip and ensure even planting and he can easily test it in such a way as to be confident that nothing but strong, healthy seed is being planted.

For seed bought in bulk the best method of home testing is that illustrated in Fig. IV. The soil in the box should be kept moist, but not wet, and the test carried on in a warm place. It is well in all such tests to germinate some seeds of known excellence under the same conditions as the sample for comparison.

Where the corn is on the cob,

grains from each ear should be tested separately. For this purpose, the method shown in Fig. V is very satisfactory. A shallow box is filled to a depth of one inch with sand, over which is placed a sheet of heavy cotton plainly ruled by a soft pencil into two-inch squares. These squares are numbered. The ears are arranged in rows, or have slips of paper pinned to their butts with numbers corresponding to those on the squares. From each ear five kernels are taken and placed on the corresponding square. The kernels

good conditions, fail to give four sprouted kernels at the end of ten days are weak and should be discarded.

Beans and Peas as noted above are tested in the laboratory between folds of cloth. They are very susceptible to mould, which, when blotters are used, spreads from seed to seed and prevents proper testing. This is not so in soil or sand testing and the soil box method illustrated in Fig. IV gives very accurate results. The completion of the test is hastened by soaking the seeds in warm water for three or four hours before

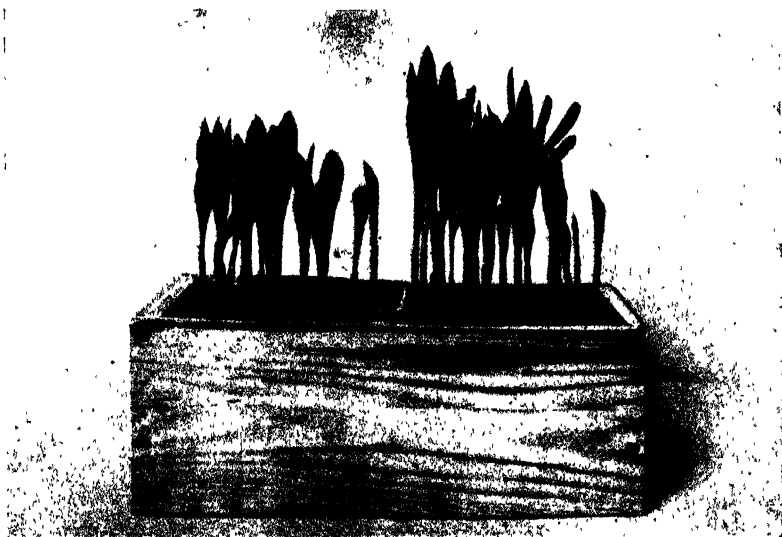


FIG IV. A SOIL-BOX TEST OF CORN

Both lots tested were apparently good but the test shows a considerable difference

should be taken from different rows, and at different distances from the tip of the ear. When the squares are all full, they are covered with a sheet of muslin or thin cotton, over which is another heavy sheet, large enough for the edges to project above the sides and ends of the box. Above this is placed sand to a depth of three-quarters of an inch. The whole is kept moist and warm, and the seeds may be observed from time to time by removing the top cotton with the sand and carefully rolling back the muslin. Ears which, under

planting them.

One "ball" of *Beet* or *Mangel* seed contains from one to six seeds. The official test indicates the number of balls per hundred which contain germinable seeds and the number of sprouts produced. In some laboratories only the per cent of balls which germinate is reported. These seeds cannot be tested by sowing them in soil like corn or beans, for then one could only ascertain the total number of sprouts and would have no means of knowing how many balls had germinated.

In the laboratory the tests are made either in boxes of blotting paper, or on the top of moist sand in the germinator. Seed composed of large, greyish brown balls is to be preferred. In some cases holes may be seen where the small seeds have dropped out, and when this is the case the seed should be carefully tested before sowing.

The grasses are a most interesting group from a germination standpoint. Some require a month for the completion of a test. For others ten days is ample. Still others require fifteen or twenty days. Although many members of the group are natives of the cooler climates we

found that the most difficult of the seeds germinate best when placed on top of moist clay or garden soil.

The blue grasses have seeds which illustrate in an extreme way the difficulties of this group. It requires twenty-eight days to complete a test, and even in this time good results are not obtained without special methods. The seeds are spread on the top of clay in earthen saucers and are placed during the day in a light germinator which is heated to 95 degrees F. At night they are removed from the germinator and placed in the open air. A night temperature of 58° to 60° F. gives best results. Why these great

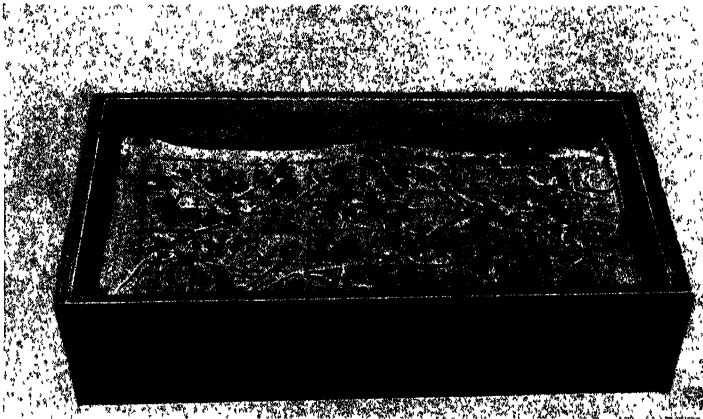


FIG. . A METHOD OF MAKING EAR TESTS OF SEED CORN

find it advisable to test them all in the high temperature germinators. In some instances this appears to be due to peculiarities which make the variations in temperature of great benefit, but what these peculiarities are, and whether they are to a greater or less extent characteristic of the group, are problems still to be worked out. The presence or absence of light during germination also effects the test, and we germinate all our common grasses in Hamburg germinators under direct light from a window. The substratum on which they are germinated is another point on which grass seeds are sensitive. After much experimenting it has been

and rapid fluctuations in temperature increase the germination is a very interesting problem.

LOW TEMPERATURE SEEDS

Most of the space in the low temperature germinators is taken up by cereals. These can all be satisfactorily tested at home in a soil box and in most cases such a test is preferable to a laboratory report.

Wheat is subject to several weaknesses which lower its germination, but the experienced observer can detect most of these by inspection. Injury by frost is indicated by very fine wrinkles of the coat, bin-burnt

grains have a brownish colour and a peculiar taste, kernels which have been injured by rust are shrunken. This shrunken wheat often gives a high germination test, but the plants are weak, owing to lack of food material in the seed.

Cereals grown near the northern limit of production show certain peculiarities of germination. Wheat and oats were formerly tested in high temperature germinators. Experiments with our western crops have shown, however, that the wheat and oats grown there germinate better at the lower temperature, especially those from regions where the weather becomes cool before the grain is thoroughly ripened. In the case of oats it has also been necessary to increase the duration of a test from ten days to fourteen. Light oat grains with small kernels like shrunken wheat, give poor stand even if the germination is high, and should be milled out of the seed. Oats which have been frozen may be plump, heavy, and of excellent appearance, and yet contain a large percentage of dead kernels. For this reason great care should be taken in choosing seed. The soil box test is very satisfactory.

Barley has a peculiarity which should be noted. When the grain has become damp under conditions which inhibit germination, it refuses to sprout until dried out again. This

property is shared to a lesser extent by northern-grown oats. The explanation is not known, but the fact must be remembered in testing, or much good seed will be discarded.

The *Clovers* are low temperature seeds which have a tendency to "hard-seededness". In their coats is a waterproof layer and if this is intact the seed may remain for months or years without germinating. In seeds threshed by hand a large percentage of hard seeds is usually found, but the clover huller scratches or breaks the coats of many, so that they will grow. It is probable that most of the hard seeds produce plants after lying in the ground for longer or shorter periods. In germination reports credit is given for one-third of them.

Many varieties of seeds not mentioned in this paper are sent to the laboratory for germination tests. Some of them require special treatment, and research work is constantly being carried on to find out the peculiarities of those seeds about which little is known. This branch of the laboratory work is a very important one, not only from the standpoint of seed testing but from that of crop production. We are hoping in the future to give it increased attention and to make it of more practical value to the agriculturist.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE WHO HAVE ENLISTED FOR OVERSEAS SERVICE

Ralph Langille, Experimental Farm, Nappan, N.S.
Seymour Edmunds, Experimental Farm, Lacombe, Alta.
S. Ransom, Health of Animals Branch, Vancouver, B.C.

CASUALTIES

J. A. P. Arden, Experimental Station, Sidney, B.C. (Killed in action).

THE HEALTH OF ANIMALS BRANCH

REGULATIONS RELATING TO TUBERCULOSIS

HIS Excellency the Governor-General in Council is pleased to rescind and doth hereby rescind the Regulations relating to Tuberculosis, approved by Order-in-Council dated 18th May, 1914, and is further pleased to order that the attached Regulations shall be and the same are hereby substituted in lieu thereof:—

1 The aid of the Department of Agriculture will be given to such cities or towns, as are in a position to fulfil their part in the following regulation and shall have secured the necessary provisions under provincial legislative authority for the purpose of agreeing to the present regulations.

2. The Government of Canada will assist any city or town, which shall have signified in writing to the Veterinary Director General its desire to have the aid of the Department of Agriculture in controlling bovine tuberculosis in the cows supplying milk and cream to the said city or town, provided the said city or town shall have stated in its application for the aid of the Department of Agriculture, as aforesaid, that, being thereunto duly empowered by law, it will undertake and provide that:—

(a) Dairies in which milk or cream are produced for sale therein shall be licensed.

(b) No license shall be issued unless the dairy conforms to the required standard.

(c) The standard shall require that the stable shall have an ample amount of air space, and at least two square feet of window glass for each cow, and shall be well ventilated, drained, and kept clean and sanitary.

(d) Two years from the date of the first test of the cattle of a dairy, the sale within the said city or town of unpasteurized milk or cream from the said dairy shall be prohibited, unless the veterinary inspector can certify that the said herd contains no reactors and in his opinion is free from tuberculosis.

(e) An Inspector or Inspectors shall be appointed and paid by the said city or town, whose duty it shall be to see

that the undertakings and provisions, as aforesaid, are carried out, and that the cows are kept clean and properly fed and cared for.

3. The Veterinary Director General on receiving notice in writing, from any such municipality of its desire to have the assistance of the Department of Agriculture, as aforesaid, shall forthwith make inquiry and if satisfied that the foregoing requirements are being carried out shall send veterinary inspectors from the Department of Agriculture to inspect the said cows.

4. The Veterinary Inspectors shall use the tuberculin test (except as provided for in section 13), and also make a careful physical examination of the cows, in order to determine whether they are healthy or not. Dairy bulls shall also be examined and subsequently treated in the same way as cows.

5. Following the examination and test the diseased cows and reactors shall be dealt with as follows:—

(a) Cows which in the opinion of the Veterinary Inspector are affected with open tuberculosis and are distributing the germs of the disease through the milk, faeces or sputum, shall be sent to an abattoir under inspection and there slaughtered as soon as conveniently can be done. When no such abattoir is within reasonable distance, the cows shall be slaughtered in the presence of the Veterinary Inspector, who shall direct how the carcass shall be disposed of.

(b) Reactors to the test shall be separated from non-reactors as effectively as possible, (suspicious animals shall be classed as reactors), and the owner shall be given the choice of disposing of them in one of the following ways:—

1. Immediate slaughter.

2. Slaughter after they have been prepared for the block, by drying off and feeding.

3. Retaining them in the herd, and selling no milk or cream until it has been pasteurized.

6. Compensation shall be paid to the owner of the herd for all cows slaughtered under these regulations upon the following basis:—

1. One-half of the appraised value of the cow if destroyed as a case of open tuberculosis.
 2. Two-thirds the appraised value of the cow if destroyed as a reactor at the request of the owner.
 3. Valuation shall be made by the Veterinary Inspector, and shall not exceed the maximum valuation for cattle as specified in Section 6 of the Act.
 7. The carcass of any animal slaughtered under these regulations shall belong to the owner and shall be disposed of as the Veterinary Inspector may direct.
 8. No compensation shall be paid to the owner unless, in the opinion of the Minister, he assists as far as possible in the eradication of the disease by following the instructions of the Inspector as to disinfection, etc.
 9. Milk, or cream from a herd containing reactors shall not be sold in the raw state except to a dairy company or dealer equipped with the necessary apparatus for scientific pasteurization. Scientific pasteurization means raising the temperature of the milk or cream to 145 degrees Fahrenheit and maintaining it at that temperature for at least twenty minutes. Inspectors of the municipality shall see that this provision is carried out. Recording thermographs shall be used in all pasteurizing plants.
 10. Tests and examinations of the herds shall be made whenever deemed necessary by the Veterinary Director General and after each test and examination the herd shall be dealt with in the manner aforesaid.
 11. All cows bought by the owner of a herd while under control, shall be submitted to the test and successfully pass it before being placed with the healthy cows.
 12. When two successive tests fail to detect any reactors in a herd it shall be deemed healthy, and the Veterinary Inspector shall, when requested, give a certificate to that effect.
 13. To facilitate the operation of these regulations, the Medical Officer of Health of any city or town which has applied for Federal assistance under them, may by agreement with the Veterinary Director General classify all dairies supplying his municipality into two classes, viz.:—
 - (a) Raw milk dairies.
 - (b) Pasteurized milk dairies.
- Class (a) dairies shall then be dealt with under clauses 3, 4, 5, 6, 7 and 8. Class (b) dairies need not be submitted to the tuberculin test and shall be dealt with under clause 9 in the same manner as herds containing reactors.
14. Whenever in the opinion of the Veterinary Director General the work of eliminating tuberculosis from the herds supplying a municipality has reached a satisfactory point, he may notify the Medical Officer of Health that the Department of Agriculture has terminated its work in that locality, and thereafter the municipality will be expected to maintain the standard reached.
 15. The existing regulations respecting Tuberculosis, approved by Order-in-Council under date the 18th May, 1914, are hereby repealed.

POULTRY DISEASES

BY A. B. WICKWARE, V.S., ASSISTANT PATHOLOGIST, IN CHARGE OF POULTRY INVESTIGATIONS

THERE is probably no phase of the poultry industry which has received so little attention in Canada as the conservation of the health of fowls. This is in part due to deficient instruction along these lines in our educational institutions, in some of which this important feature of the live stock industry is apparently unappreciated, while in the remainder the alluring commercial aspect of poultry culture has been given prominence to the utter exclusion of the vexatious problem of diseased conditions.

It is not to be wondered at, therefore, that almost every individual who takes up poultry keeping as a hobby or in its more serious aspect,

fails to realize the extreme importance of maintaining the flock at the highest possible state of efficiency as a means of rendering the fowls resistant to infection.

By the more enthusiastic fanciers, careful thought is given to the selection of breeders, the provision of modern poultry houses and the feeding of suitable rations for egg production, fattening, etc. Unfortunately, however, in a large majority of cases little attention is paid to the hygienic surroundings; droppings are allowed to accumulate; litter to become damp and sticky and feeding troughs and drinking utensils to become filthy, thus affording admirable conditions for the

development of infectious diseases, not to mention the breeding of mites, lice, etc.

As a result of this indifference, tuberculosis and other disorders have become widely disseminated throughout Canada due to promiscuous distribution of infected breeding stock and the possible danger from contaminated eggs for hatching.

During the past few years the Federal Department of Agriculture, through the agency of the Biological Laboratory, has endeavoured in a limited way, to study some of the problems and underlying causes of infectious diseases of poultry, and considerable experience has been gained in regard to the treatment and prevention of many disorders.

As it has been estimated that approximately fifty per cent of all chicks hatched fail to reach maturity, or, in other words, it takes four eggs to raise one chick, the necessity for specialization in this particular line was, forcibly, impressed upon those engaged in this industry.

To supplement this loss, probably ten per cent of all fowls reaching maturity are also annually lost through preventable causes, and it was therefore deemed advisable to appoint one man to study poultry diseases exclusively.

Dr. F. Torrance, Veterinary Director General, after conferring with the officials of the Dominion Experimental Farm, assigned the writer to co-operate with the Poultry Division in this work. Already, considerable research has been outlined which it is hoped will assist in conserving this industry, and controlling some of the disorders now exerting such deleterious effects.

There are many diseases met with throughout Canada which are very troublesome and oftentimes disastrous, and a few of the more important ones are herein mentioned.

Consumption or Tuberculosis of fowls.

Roup (Avian Diphtheria) of fowls.

Blackhead (Enterohepatitis) of turkeys.

Intestinal worms.

Chick mortality.

Consumption or tuberculosis is found in almost every province throughout Canada, and, when it appears in a flock, the results are at once apparent. The fowls rapidly lose condition, go light, and may linger in this state for an extended period, or may die in a short time. The death rate is very high and the egg yield is reduced to the minimum. Radical measures are necessary in dealing with this affection and the surest means of eliminating it from the premises is to kill off the entire flock, thoroughly disinfect the quarters and run and start again with chicks or eggs from a reputable source. Considerable time has been devoted to a study of this disease and a general bulletin dealing with this affection is available for distribution by applying to the Publications Branch of the Department of Agriculture.

Another disease which has been carefully studied at the Biological Laboratory is black-head in turkeys and this is admittedly one of the most vexing disorders in the whole category of poultry diseases. Not only is the exact cause a matter of conjecture but the insidious nature of the disease renders it almost impossible to tell an affected from a normal individual until such time as the birds are beyond the stage of experimental study. It has recently been stated by an eminent authority that the turkey industry is doomed to utter extinction unless some means can be found for controlling the ravages of black-head. Investigations are still being conducted with a view of throwing new light upon the cause, cure and prevention of this fatal malady and a popular bulletin, summarizing some of our work with this disease, can likewise be obtained through the Publications Branch.

Roup is an affection which is commonly met with during the winter months and in some cases resulted in enormous losses. In other instances where the disease

appears in a mild or chronic form the affected birds lose condition and stop laying. During the past few years, treatment has been principally confined to isolation of all affected birds, disinfection of the premises, provision of plenty of sunlight and fresh air with freedom from dampness and drafts.

The application of mild disinfectants to the heads of affected fowls has also been practiced and, in the first stage, gives fair results. Recently, however, experimental work has been carried on with specially prepared vaccines which are made by growing different varieties of microbes or germs and injecting these into the fowls to produce a resistance or what is known as immunity to the disease. The principle is the same as that used to prevent smallpox in the human being

and thus far the results are very favourable. However, owing to the special methods of preparation and administration much work remains to be done before the treatment can be recommended for general use.

Invasions with intestinal worms constitute another serious disorder which is also met with throughout Canada. These parasites are present to a greater or lesser extent in almost every poultry yard and, in some instances, become so numerous and injurious as to cause great losses, not to mention the general unthriftiness and unproductiveness of affected fowls.

A popular bulletin dealing with the life history of the parasites, symptoms, treatment and prevention is almost ready for publication and will be obtainable upon request.

CONTAGIOUS ABORTION

BY F. TORRANCE, B.A., D.V.S., VETERINARY DIRECTOR GENERAL

FOR some years the staff of the Health of Animals Branch have been experimenting with regard to this disease. The progress is necessarily slow, as can readily be seen by anyone who considers that all experiments must be carried out in relation to the breeding season.

Sufficient progress has now been made to warrant the publication of the facts which have been already ascertained. These are presented in the form of a table appended hereto.

It will be seen that the line of our work has been chiefly in the direction of ascertaining some practical method of producing immunity in breeding animals. Different vaccines of our own manufacture have been used for this purpose and various methods of administration have been tried. We have now arrived at a method which appears to give

fairly uniform and satisfactory results, and the permission of the Minister has been secured for the extension of our work to a certain number of herds of breeders who desire to have this method tried upon their animals.

No bad results have hitherto been noted following inoculation with our vaccines, consequently no injury may be anticipated from this source. The results are not guaranteed in any way, but judging by the limited experience obtained, the owner of an infected herd may expect satisfactory results.

Breeders who desire the assistance of the Department in treating their herds should make application to the Veterinary Director General stating the number of animals in their herds and their willingness to cooperate in all measures necessary for the control of the disease.

RECORD OF EXPERIMENTAL

LOT

No.	Age	Previous Abortions	Previous Treatment	Blood Test		Inoculated with Vaccine			
				Date	+or—	Date	Date	Date	
1	Year								
1	1	0	0	Jan. 26, '15	—	Jan. 27, '15	.....	.....	.....
2	1	0	0	Jan. 26, '15	—	Jan. 27, '15	.....	.....	.....
3	1	0	0	Jan. 26, '15	+	Jan. 27, '15	.....	.....	.....
4	1	0	0	Jan. 26, '15	—	Jan. 27, '15	.....	.....	.....

LOT

5	1	0	0	Mar. 20, '15	—	Mar. 24, '15	.....	.....	.....
6	1	0	0	Mar. 20, '15	+	Mar. 24, '15	.....	.....	.....
7	1	0	0	Mar. 20, '15	—	Mar. 24, '15	.....	.....	.....
8	1	0	0	Mar. 20, '15	+	Mar. 24, '15	.....	.....	.....
9	1	0	0	Mar. 20, '15	—	Mar. 24, '15	.....	.....	.....
10	1	0	0	Mar. 20, '15	—	Mar. 24, '15	May 4, '15	.....	.....
11	1	0	0	Mar. 20, '15	—	Mar. 24, '15	May 4, '15	.....	.....
12	1	0	0	Mar. 20, '15	—	Mar. 24, '15	May 4, '15	.....	.....
13	1	0	0	Mar. 20, '15	+	Mar. 24, '15	May 4, '15	.....	.....
14	1	0	0	Mar. 20, '15	+	Mar. 24, '15	May 4, '15	.....	.....

LOT

15	1	0	0	Aug. 3, '15	+	Aug. 5, '15	.....	.....	.....
16	1	0	0	Aug. 3, '15	+	Aug. 5, '15	.....	.....	.....
17	1	0	0	Aug. 3, '15	—	Aug. 16, '15	.....	.....	.....
18	1	0	0	Aug. 3, '15	—	Aug. 16, '15	.....	.....	.....

LOT

19	6	1	Methylene Blue	Aug. 9, '15	+	Sept. 16, '15	Oct. 5, '15	.....	.....
20	7	1	do	Aug. 9, '15	—	Sept. 16, '15	Oct. 5, '15	.....	.....
21	2	1	do	Aug. 9, '15	+	Sept. 16, '15	Sept. 25, '15	Oct. 5, '15	.....
22	4	3	do	Aug. 9, '15	+	Sept. 16, '15	Sept. 25, '15	Oct. 5, '15	.....
23	3	1	Dr. Watson's Vaccine	Aug. 9, '15	+	Sept. 16, '15	Sept. 25, '15	Oct. 5, '15	.....
24	2	1	do	Aug. 9, '15	+	Sept. 16, '15	Sept. 25, '15	Oct. 5, '15	.....
25	3	1	Methylene Blue	Aug. 9, '15	+	Sept. 16, '15	Sept. 25, '15	Oct. 5, '15	.....
26	5	1	0	Aug. 9, '15	+	Sept. 16, '15	Sept. 25, '15	Oct. 5, '15	.....

LOT

27	3	2	Methylene Blue	Dec., '15	+	Dec. 9, '15	Dec. 20, '15	.....	.....
28	6	1	Dr. Watson's Vaccine	Dec., '15	+	Dec. 9, '15	Dec. 25, '15	.....	.....
29	2	1	do	Dec., '15	+	Dec. 9, '15	Dec. 25, '15	.....	.....
30	4	1	Methylene Blue	Dec., '15	—	Dec. 9, '15	Dec. 25, '15	.....	.....
31	1	0	0	.....	.....	Dec. 9, '15	Dec. 25, '15	.....	.....
32	1	0	0	.....	.....	Dec. 9, '15	Dec. 25, '15	.....	.....
33	1	0	0	.....	.....	Dec. 9, '15	Dec. 25, '15	.....	.....
34	1	0	0	.....	.....	Dec. 9, '15	Dec. 25, '15	.....	.....

*Records of herd destroyed by fire.

NOTE.—The culture vaccines used were prepared by Dr. J. C. Reid at the Biological Laboratory, Ottawa, and are pure culture of the *bacillus abortus* (or Bang's Bacillus) isolated by himself. The Health of Animals Branch is now ready to extend this work to the herds of a limited number of breeders who are willing to give the necessary assistance to the Inspector, to follow his

WORK IN CONTAGIOUS ABORTION

No. I

Injected with Serum, Date	Bred, Date	Calved, Date	Aborted, Date	Result, + or —	REMARKS
.....	Apr. 23, '15	Jan. 26, '16	.....	+	Inoculated with 20 c.c. living culture
.....	Dec. 18, '15	Sept. 11, '16	.....	+	do do do
.....	Apr. 23, '15	Jan. 12, '16	.....	+	do do do
.....	Apr. 21, '15	Jan. 26, '16	.....	+	do do do

No. II*

.....	.....	.....	.....	+	Inoculated with 5 c.c. killed culture
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	Inoculated Mar. 24, 5 c.c. killed cultures
.....	.....	.....	.....	—	Inoculated May 4, 10 c.c. living cultures
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	do do do
.....	.....	.....	.....	+	do do do

No. III

Aug. 5, '15	Dec. 16, '15	.....	July 12, '16	—	Inoculated with 10 c.c. serum and 5 c.c. living culture
Aug. 5, '15	Aug. 25, '15	.....	Apr. 16, '16	—	do do do
Aug. 16 & Aug. 5, '15	Dec. 23, '15	Sept. 20, '16	.....	+	Inoculated with 20 c.c. serum and 10 c.c. living culture
Aug. 5 & Aug. 16, '15	Nov. 9, '15	Aug. 5, '16	.....	+	do do do

No. IV

Sept. 25 & Oct. 5, '15	Mar. 31, '16	.....	Nov. 20, '16	—	Inoculated with 5 c.c. abortein, 10 c.c. live culture and 20 c.c. serum
Sept. 25 & Oct. 5, '15	Jan. 10, '16	Oct. 6, '16	.....	+	do do do
.....	Oct. 10, '15	July 12, '16	.....	+	Inoculated with 5 c.c. abortein, 10 c.c. killed culture, 10 c.c. living culture
.....	.....	sterile	.....	.....	do do do
.....	Oct. 11, '15	July 28, '16	.....	+	do do do
.....	Dec. 18, '15	Sept. 22, '16	.....	+	do do do
.....	Mar. 14, '16	Dec. 13, '16	.....	+	Inoculated with 5 c.c. abortein, 15 c.c. killed culture, 10 c.c. living culture
.....	Dec. 18, '15	Sept. 22, '16	.....	+	Inoculated with 5 c.c. abortein, 20 c.c. killed culture, 10 c.c. living culture

No. V

.....	Jan. 6, '16	.....	Aug. 12, '16	—	Inoculated with 10 c.c. killed culture and 5 c.c. living culture
Dec. 9 & Dec. 25, '15	Dec. 21, '15	Oct. 2, '16	.....	+	Inoculated with 10 c.c. killed, 5 c.c. living and 20 c.c. serum
.....	Mar. 28, '16	Dec. 23, '16	.....	+	Inoculated with 10 c.c. killed and 5 c.c. living culture
Dec. 9 & Dec. 25, '15	Jan. 13, '16	Oct. 15, '16	.....	+	Inoculated with 10 c.c. killed, 5 c.c. living culture and 20 c.c. serum
.....	Jan. 18, '16	Oct. 22, '16	.....	+	Inoculated with 10 c.c. killed and 5 c.c. living culture
Dec. 9 & Dec. 25, '15	Mar. 2, '16	Dec. 6, '16	.....	+	Inoculated with 10 c.c. killed and 5 c.c. living culture and 20 c.c. serum
.....	Jan. 22, '16	Oct. 30, '16	.....	+	Inoculated with 10 c.c. killed and 5 c.c. living culture
Dec. 9 & Dec. 25, '15	Jan. 16, '16	Oct. 27, '16	.....	+	Inoculated with 10 c.c. killed, 5 c.c. living and 20 c.c. serum

advice and to keep a careful record of the herd. Treatment will be without cost to the owner. Applications should be made to the Veterinary Director General and will receive attention in the order received.

THE FRUIT BRANCH

THE APPLE EMBARGO

FROM time to time requests have been received by the Fruit Branch of the Department of Agriculture for information with respect to the embargo placed on apples entering Great Britain.

All through the apple export season of 1916 there existed a certain amount of uneasiness among the Canadian shippers for the reason that on several occasions in the past year the President of the British Board of Trade had hinted at the possible necessity for prohibiting the importation of fresh fruit in order to relieve space for cargo more urgently needed for the successful prosecution of the war. It was not, however, until February 24th, 1917, that the Board of Trade included "raw fruit of all descriptions (except lemons and bitter oranges)" among the importations prohibited into the United Kingdom except under license.

The following is a statement sent the Fruit Branch by Mr. J. Forsyth Smith, Canadian Fruit Trade Commissioner, Liverpool, showing the conditions under which licenses might be secured:—

1. All apples bought and paid for by firms in the United Kingdom prior to February 24th will be admitted by license, if payment has been made in full with money remitted from this side.

2. All apples en route to shipping point, which had left point of origin prior to February 24th, and which were intended for shipment by steamers either loading or intended to load will be allowed to be imported freely.

3. Apples bought prior to February 24th and partially paid for will not be entitled to a license. Nor will apples shipped for sale on shippers' account, notwithstanding that advances may have been made. Some concessions may be granted under this category in special cases the full facts of which have been presented to the Department.

4. Apples purchased or stored for later shipment, the money for the purchase of which has not been transmitted from the United Kingdom, will not be entitled to a license.

5. Apples for which a license may be granted or apples arriving in the United Kingdom which may have been shipped after February 24th and any at sea at the present time will be allowed to land, and be dealt with by the consignee, upon said consignee depositing the value of the goods with the Department, and this deposit will be returned as soon as convincing proof that they are entitled to land is received and submitted from the other side. Apples en route to shipping point prior to February 24th must be clearly proven to have been intended for export before they were started rolling.

Such were the conditions governing the obtaining of a license until the middle of March, but in the meantime representations were being made through the acting High Commissioner for Canada showing the need for some relaxation of this embargo to permit the shipping of the balance of the Canadian apple crop. A cablegram from the Colonial Office, dated the 13th of March, stated that prohibition to import fruit into the United Kingdom was still under consideration, but that it had been decided that overseas supplies of fruit to the Navy, including gifts from British Dominions overseas, should be allowed to be continued in spite of the prohibition. A further cablegram from the same source, dated March 17th, stated that it had been decided to admit fruit from any part of the British Empire equivalent to fifty per cent of the 1916 imports on the understanding that this applied to the present crop only. The cablegram also stated that after the end of July, 1917, prohibition would be absolute unless the conditions in question were changed by that time.

It will thus be seen that so far as the 1916 crop of apples is concerned, Canadian shippers have not suffered seriously from the embargo, as it has been possible to secure a license for the entry into the United Kingdom of any apples destined for that market.

PART II

Provincial Departments of Agriculture

SOIL SURVEYS

NOVA SCOTIA

BY L. C. HARLOW, B.Sc., B.S.A., CHEMIST, AGRICULTURAL COLLEGE

NOVA Scotia has frequently been surveyed. Every railroad which has been projected was preceded by the surveyor who measured, studied and mapped every detail of the proposed course. The geologist has examined the rocks, noting the kind, extent and outcrops, and has put his observations into a geological map which shows rocks characteristic of many geological periods.

The miner has dotted our maps with various marks to show where the gold, copper and other economic minerals may be found.

Again, the lumberman has had expert foresters make a map to show the details concerning the hardwood, softwood and barren land of the various counties of the province.

All these are valuable guides for anyone preparing to start mining or lumbering in any locality or in indicating our resources.

It is only reasonable that the farmer, who must, to quite an extent, depend upon what the soil can give him, should have some quite exact information regarding the soil of his farm. The stranger in selecting a farm, should, among other factors, be guided by the type of soil peculiar to that locality. The son who inherits the homestead should know as near as possible the amount of plant food in every acre of the farm.

This information a soil survey should provide; it should also furnish information regarding the physical condition of the soil, the water supply, drainage, and all facts necessary to enable a person to select a farm adapted to any particular type of farming.

The results of such study in the United States are now being put into elaborate maps. There the soil chemist, the surveyor and the soil physicist of the Department of Agriculture at Washington, and the State Department co-operate. No such extensive plan of work as this has been attempted in Nova Scotia.

With a view of getting some idea of the total amount of plant food in the soils of the different geological areas of Nova Scotia, the writer in 1908 began the study of the marsh soils, which are, no doubt, the best soils in our province. Twenty-four such soils from productive and worn-out fields were fully analyzed and results tabulated. In 1911, the work was extended to the upland and intervale soils of the central part of the province, emphasizing the composition of the worn-out lands as compared with the virgin soils. The results of the complete analysis of eighty-eight samples of marsh, upland and intervale soils are given in the report of the Secretary for Agriculture for 1913.

Since that time the work has been combined with emphasis on the physical analysis for the determination of the varying percentage of clay, sand, silt and organic matter and upon the study of representative samples carefully taken from different sections of the province, as the Annapolis Valley and the north shore of Cumberland county. The work of 1914 emphasized certain parts of Hants county and the Annapolis Valley. Thirty-eight samples were analysed and reported upon to the Secretary for Agriculture in that year.

Nova Scotia, on account of so many low hills and so much transported soil, has no large areas of any one type of soil; even a small area often shows marked variations

in the amount of clay and sand. No area measurements or mapping of such deposits have been attempted and thus far only general recommendations regarding soil needs can be made.

In 1915-16 one hundred and two soils were studied and results given in the report for 1916 now in press. These included soils from the north shores of Hants and Cumberland counties, from a part of East Pictou county and the Sackville Valley of Halifax county, thirty-five from farmers in as many parts of the province, and sixteen examples of the black organic soils found in areas of varying size in many parts of Nova Scotia.

The following table shows the composition of a few typical soils:—

	A	B	C	D	E	F	G
Nitrogen . . . . .	.14	.13	.14	.32	.12	.54	1.6
Phosphoric acid. . . . .	.16	.14	.22	.19	.13	.03	.16
Potash. . . . .	.99	.28	.26	.27	.26	.07	.07
Lime. . . . .	.65	2	.25	.2	.15	.2	1.3
Magnesia.	1.58	1.21	.28	1	1.22	.22	1
Water in air (dry soil).	1.43	.44	1.2	3.4	4.85	4.1	15.25
Volatile (mostly organic)	5.75	6.54	5.35	12.3	5.95	64.05	72.7
Insoluble.	78.33	85.59	87.18	70.77	76.22	30.82	7.94
Soda . . . . .	.36	.05	4	.48	.63	.04	.18
Iron oxide and alumina.	11.2	6.46	4.96	11.9	10.50	1.1	2
Sulphuric acid. . . . .	.09	.09	.14	. .	.07	. . . . .	. . . . .

A is an old marsh soil.

B from worn out carboniferous limestone area.

C virgin triassic sandstone soil.

D cultivated Cambrian stale soil.

E virgin soil of best orchard land of the Annapolis Valley.

F peaty soil from limestone part of the province.

G peaty soil from non-limestone part of province.

Practically all the soils tested show an acid reaction. The average total lime present as determined by acid solution of the soils tested is only .3 per cent. These two facts strongly indicate the need of additions of either lime or limestone.

Many lime requirement tests have been made which indicate the need of about 4 tons per acre of ground limestone to overcome the acid condition of the average soil. This work has included the examination

of the large number of deposits of limestone, marl and gypsum, which are found in the eastern half of the province.

While there is often great diversity of surface and much physical variation in the soil of small areas yet there is much uniformity in the chemical composition of the soils studied. The average of potash is quite high, that of lime very low, while phosphoric acid and nitrogen are in fair amounts, though often very low.

Most of the soils are low in organic matter. The work done suggests the application of limestone and phosphates, also gypsum in some cases. These aid in the growth of legumes, the decay of which will

supply nitrogen and set free potash.

In conclusion, our soil survey, being developed along the chemical side, lacks the mapping of the areas which have different agricultural possibilities.

ONTARIO

BY R. HARCOURT, B.S.A., PROFESSOR OF CHEMISTRY, ONTARIO AGRICULTURAL COLLEGE

THE Department of Chemistry of the Ontario Agricultural College have been working on the preliminary soil survey of this province for the past two seasons and have completed the field work on that part of the country lying west of a line running north from Toronto. The maps of this district are ready for the printer and we hope to have the laboratory examination of the soils completed shortly when we will be ready to publish our first report of this important line of work.

As this is the first work of this kind undertaken in Canada, it may not be out of place to very briefly describe what we are doing and what we hope to accomplish.

A soil survey is really taking an inventory of our soil resources in order that we may be in a position to make a systematic study of the deficiencies and capabilities of our soils. We are examining the soils in the field that we may determine the different types, their origin, how they were formed and their various properties and characteristics. The location of the various types is indicated on coloured maps. In conjunction with the field work, we are making a mechanical and chemical study of the soils and then seeking to further work out the particular problems of each type on so-called demonstration plots located on typical soil of the type in centres where they may be freely observed by those interested.

In connection with the classification work in the field, one of the important factors noted is the origin

of the soil and the various processes that operated in changing the rock materials into a cultivatable soil, and associated with this is the presence or absence of organic matter and lime. The texture of the soil is also taken into consideration; for this is a very important physical characteristic. It is evident that it is necessary to take into account not only the texture of the surface and subsoil, but also the character of underlying material; for this last factor particularly influences the natural drainage.

Colour is also an important consideration, as it indicates the physical and chemical condition. The structure of the soil must be noted. That is, we must ascertain whether it is compact and impervious, or loose and granular and easy to cultivate, or whether it runs together and is difficult to work. Thus origin, texture, colour, structure, the amount and condition of organic matter, lime, native vegetation and crop yields all must be considered in this work, and any other factors that have apparently influenced the growth of plants must not be overlooked if a proper classification of the soils is to be obtained.

Coming now to what we hope to accomplish by this work. It may be pointed out that one of the great needs in agricultural work to-day is a more general recognition of the fact that soils differ widely in their capabilities. Much valuable time and money has been wasted trying to draw conclusions from experiments conducted on entirely dissimilar

oils. Many of the contradictory and seemingly unexplainable results obtained by different investigators, or even by the same investigator, are undoubtedly due to fundamental soil differences which would have been evident from a fuller comparative field examination. With the widely varying types of soils in the province it is impossible for one farmer to be guided by another regarding the kind, or even the variety, of crop he should grow, the fertilizer he should use, or even the method of cultivation to be employed.

A good illustration of what may be gained by the proper adaptation of the crop to the soil was obtained on one of our demonstration plots. The soil is a light sand that has lost so much of its organic matter that it "blows" badly. At a depth of four and five feet there is clay which keeps it fairly well supplied with water. In the season of 1914 the oat crop grown on this land did not yield more than 10 bushels per acre. The next year we took it over as a demonstration plot and planted a part of it with potatoes. A portion of the range was left unmanured in any way and yielded potatoes at the rate of slightly over 100 bushels per acre, while the part which was manured and fertilized yielded at the rate of over 400 bushel of good marketable potatoes. Last year, 1916, although it was a very unfavourable season, we secured over 200 bushels per acre of good sound potatoes. This soil is undoubtedly adapted to the growing of potatoes and vegetables in general and will give very much better cash returns in this way than if sown with grains. There does not appear to be any reason why this district should not become as well known for the quantity and quality of potatoes it will produce as Caradoc township, Middlesex county, or Hepworth in Bruce county.

A further illustration of this same adaptation of crop to soil is seen in the growing of onions in the peaty soil on Pelee Point and celery on the

swampy land near Thedford. Or, in a much larger way, in the location of the apple and peach orchards, or other fruits on particular types of soil. Climate condition naturally has an influence on this whole question and must be taken into consideration in the whole scheme of soil survey.

The quality of the crop is also influenced by the soil. This is seen in the better quality of apples produced in some districts, and by the fact recognized by the miller, that the wheat grown in certain parts of the country will produce a better quality of flour than can be obtained from the same variety grown in another district.

Regarding the question of plant food in soil, we recognize the fact that our soils differ in their needs. Large areas of this province are undoubtedly in need of lime, but there are other sections, as for instance in the neighbourhood of Guelph, where lime is not required, nor is it needed on some of the soils of Lambton county, although most of the land in that district is deficient in this constituent. Again, some of our soils are badly in need of phosphorus and it is useless for farmers on these lands to buy other plant food constituents unless they first apply an abundance of this element. Recently the Ohio Experiment Station reported some results in which it was shown that in connection with a five-year rotation, consisting of corn, oats, wheat, clover and timothy, grown on the farms at Wooster and Strongsville an application of 20 pounds of phosphorus, 108 of potassium and 114 of nitrogen gave an average net profit of \$7.36 per acre at Wooster and a loss of \$2.01 at Strongsville. These results simply show the difference in the soil. Again New York and Massachusetts have been carrying on experiments with fertilizers on apple orchards for a number of years. As a result of the New York experiments it is stated "that the fertilizers have had

no sensible effect upon the yield of fruit in this experiment". Of the Massachusetts experiments the conclusion is reached that "in every respect the treated plots have proven superior to the untreated". The Ohio Experiment Station report "the increase in fruit production of the mulched and fertilized plots, as compared with those receiving no fertilization, has ranged from 200 to 1000 per cent within eighteen months from the time of the first application. Unless we take into consideration the fact that soils vary widely in their needs, these seemingly contradictory results cause confusion and the question is sometimes asked as to what the farmer is going to do when authorities disagree. The solution of the question is in all probability in the inherent differences in the soil.

The failure to recognize that the results secured on one type of soil do not necessarily hold true for another, is responsible in no small measure for the distrust which farmers have often shown towards the

work of scientific investigators. Hilgard, one of our most noted soil investigators, has said: "The history of plot experiments shows so common and unpardonable neglect on the part of experimenters to ascertain definitely the fundamental, physical and chemical conditions that their general unsatisfactoriness is easily accounted for on that score alone". Each type of soil must be studied separately. The same treatment or crop may be recommended for a similar soil but it is not likely to apply to soils of widely different type. For this reason we must broaden the scope of our study, and the object of a soil survey is to get at the fundamental differences in soils and to learn not only how to treat them in order that we may secure the best results, but also, to adapt the crop to the soil that we may obtain the maximum results in both quantity and quality. This is what we are trying to accomplish in our Soil Survey.

"Without the aid afforded by the savings of our people, the expenditures which have been made in Canada by both governments for supplies and munitions could not have been made, so that those who have saved have benefited not only themselves, but the entire community. While our national saving during the war has been gratifyingly large, it is not so great as it should have been, and to-day no better advice can be offered to the public than to exercise the strictest thrift and economy. Every additional day the war lasts makes this individual and national duty the more imperative."
—*Sir Thomas White.*

CONSERVATION AND UTILIZATION OF FARM-YARD MANURE

THE NOVA SCOTIA AGRICULTURAL COLLEGE

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE AND FARM SUPERINTENDENT

IN attempting to conserve all the fertility possible from the farm animals at the Nova Scotia Agricultural College, every effort is made to save all the urine. In order to do this all floors and gutters where live stock is kept, except in a few box stalls for horses, are made of cement and have no drainage system. All the urine must be absorbed by the bedding which consists of straw and sawdust. Sometimes these bedding substances are used separately and sometimes together.

The manure from the cattle barns is carried to a pit with cement floors, where it may remain for a few days or possibly for a few weeks. As a general rule it is quickly hauled to the fields, where it is to be used and either spread immediately or placed in a large shallow heap well packed by having the horses drive over it as each load is dumped. If the ground is bare, the manure is spread as it is hauled to the field, but, if there is snow and ice on the ground, it is generally placed in the large pile, especially if there is much slope to the field. This large pile is placed at the highest point in the field and is thus easy to spread with the manure spreader in the spring. In actual practice on the college farm this means that generally all the manure hauled in the fall before the first of January is spread as it is hauled. This preserves it to the best advantage as it is on the ground soon after being produced and has not had a chance to deteriorate.

After January 1st until some time in March, as a general rule, the manure is piled as it is hauled to the field.

The manure cellar is large enough to hold the accumulation of several weeks in case of continued bad weather for hauling.

The horse manure is removed each day to the manure pit, where the cow manure is placed, or to the pit in connection with the swine pens. Here it is mixed with cow manure or with pig manure and in the latter case worked over and tramped hard by the pigs. This treatment prevents the dry horse manure from heating and it also absorbs and holds some of the excess moisture and urine in the cow manure.

The following analysis of our system brings out the essential points:—

1. Save all the urine, by means of

- (a) Tight floors and gutters.
- (b) Use of absorbents:
 - (1) Straw.
 - (2) Sawdust.
- (c) Prevention of fermentation:
 - (1) Kept in manure cellar as short a time as possible.
 - (2) Pile kept compact.
 - (3) Horse manure and cow manure mixed.
- (d) Prevention of leaching by covered shed, or flat piles made where rain will not wash through them.
- (e) Prevention of leakage, by tight manure cellar, and liberal use of absorbents.

2. Save all fertility in the dung, by means of

- (a) Prevention of fermentation by keeping pile fairly moist and well compacted and by applying to the land as quickly as possible.
- (b) Prevention of leaching.
See above.
- (c) Prevention of leakage.
See above.

QUEBEC

BY M. GERARD, FIELD CROPS DIVISION

THE old wooden floors which keep bad odours but not liquid manure have been entirely replaced by concrete floors and thus the losses of liquid manure have been practically suppressed.

For litters, materials are chosen that have the greatest capacity of absorption for liquids. Straw, even when it is cut, has not sufficient absorbing power. Sawdust is better than straw in this respect, but black or vegetable earth or muck are way ahead of all the rest. Farmers who have vegetable earth or muck on their land may consider themselves as the happy possessors of a very valuable mine, specially if the rest or part of their farm is poor in humus. A shovelful per head and per day, thrown in the gutter, under the straw, is, I believe, the very best method of saving liquid manure in the stables. However, this does not do away with the necessity of the liquid manure tank, as there is always a small loss of liquid.

Usually the manure, most of which is produced in winter, is hauled out to the field where it is to be used when taken out of the stables, and placed in heaps three feet thick in the most convenient part of the field for the work of the mechanical spreaders, that is to say the upper part. This manure is mostly used on the corn crop for ensilage, on heavy

lands. It is spread on fall ploughing and mixed in with the disc harrow on light or loamy lands; it is spread on sod, meadow or pasture. In this case, it is, of course, ploughed in.

The manure which is produced during the summer is also taken into the field, or as near as possible to the field, where it is to be used, and ploughed in during the fall. Heaps three feet thick are made as usual; but these heaps, instead of being left bare as during the winter are covered with a layer of earth eight or ten inches thick, so as to be protected from the heat of the summer and to avoid all losses of nitrogen.

This manure ploughed in in the fall is more particularly used for the growing of tubers (potatoes and Jerusalem artichokes) and roots.

As to the manure which is produced early in the spring, when the snows are melting and when the roads are impassable for all sorts of vehicles, it is hauled a short distance from the building and used as a reserve for all sorts of purposes; cold beds, market gardening, supplement for field crops, composts. The contents of liquid manure tanks, summer or winter, are almost exclusively used for compost heaps.

Such are, on general lines, the means employed for the saving and use of our farmyard manures.

MACDONALD COLLEGE

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

THE practice in handling farmyard manure on the stock farm at Macdonald College might be called the "direct method". The manure is taken from the dairy stables twice daily by manure carriers and stored under cover until

such time as it can be taken to the field. It does not freeze to any extent in this storage. It reaches the field within two weeks after leaving the stable so that only comparatively small storage is provided, enough to allow drawing when it is most con-

venient. Manure from the box stalls in the beef cattle and bull stables is removed about every two weeks, depending upon convenience, and stored in a separate pit where it is tramped, watered if necessary, and allowed to rot somewhat for a few weeks so that it will distribute better when drawn to the field. The horse manure is handled in the same way. The liquid manure from the gutters flows to a concrete tank. This is emptied by a sewer pump and used to water the horse manure and box stall manure, where it is absorbed, and at the same time it prevents undue heating in the manure while the rotting process is under way. After attempting to handle this liquid manure in various ways this has been found, under our circumstances, the most economical and very best practice. No liquid is lost and it serves a splendid purpose in keeping and even improving the other manure.

As most of the manure is made during the winter the above practice means that the bulk of it is hauled to the fields in winter as it is made. When it is possible to use spreaders

they are used for hauling and the manure is spread on the fields at once. When spreaders cannot be used the sleighs take their place and the manure is spread by hand from them. Only two exceptions are made to this practice,—on steep hillsides and where the snow is so deep that it is difficult to break roads through, as happened for about three weeks during the past winter, the manure is not spread but is placed in large piles, distributed in the field so that the minimum amount of drawing will be necessary in spreading later. In no case is the manure distributed in small piles. This might be justified in late spring, when one wanted to haul as much as possible in a given time while the snow lasted, but otherwise it is wasteful and not economical of labour. Manure forms one of the biggest labour jobs on Macdonald College farm and farm management requirements allow no practice other than the one above outlined. Moreover, it is considered to entail as little loss of fertilizing constituents as any other system that might be adopted.

THE ONTARIO AGRICULTURAL COLLEGE

BY G. E. DAY, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

THE manure is removed from the stables by means of litter carriers, and is piled in a compact pile in an outdoor yard, so arranged that there can be no drainage from the yard.

Liquid excrement is taken up by means of absorbents, straw, chaff, shavings, etc., and goes out into the yard with the solids.

Manure is not allowed to accumulate in the yard to any extent, but is drawn out to the fields and spread upon the surface of the ground. In this way the yards are kept pretty well cleaned out at all times.

During winter, manure is not spread upon steep hillsides for fear of waste when the snow melts. In exceptional cases, when the snow is excessively deep, the manure is drawn to the fields and piled in large piles, which are distributed in the spring. When this plan is followed, it is important to drive each load upon the pile so as to pack the manure firmly, and thus check destructive fermentation. The danger of excessive fermentation leads us to avoid the plan just described when it is possible to do so.

MANITOBA

BY G. W. WOOD, B.S.A., DEPARTMENT OF ANIMAL HUSBANDRY

IN the handling and application of farmyard manure on the college farm we aim to follow the practice of removing all manure from the barns as soon as made, and draw it to a large compact pile, about one-eighth of a mile from the stables. The manure from all the barns is here mixed, and the pile is kept compact by driving over it, thereby preventing it from becoming burnt and dry. A well-kept road is maintained between the stables and the pile, so that the manure may be carted there at any season of the year. The manure is only applied to the land during the late fall and winter months. At this season, the other farm work is not urgent, and by having the manure to haul at this time, it enables us to keep both men and horses employed.

Under our conditions, we prefer to apply rotted manure to the land in preference to green manure. In the first place, a large quantity of fodder and grain is always purchased for the college stock, and manure made from such, unless it is heated, must necessarily contain a large number of noxious weed seeds.

Secondly, the rotted manure, being less bulky in nature, decays more quickly, and, when applied to the soil, does not tend to open it up so much, thus drying it out. In this country, if either straw or green manure is applied, it decays very slowly, and it takes a considerable length of time to become incorporated with the soil, with the result that the land becomes open and dries out quickly.

We apply most of the manure as a top dressing on pasture and hay land, and also on land intended for corn the following year.

In regard to our method of saving the liquid manure in the stables, we use sufficient absorbents in the way of straw to take care of this, and it is then removed at the same time as the solids, thus eliminating as much labour as possible. I presume had we a collecting cistern for holding the liquid manure, and, this valuable fertilizer were applied directly to the land by means of a tank, that we would save something, but this system would entail a great deal more labour than our present method.

THE UNIVERSITY OF SASKATCHEWAN

BY W. J. RUTHERFORD, B.S.A., DEAN, COLLEGE OF AGRICULTURE

MANURE is removed from the barns daily. Most of it is hauled directly to a pile that is located in a low place where water accumulates in spring and again during the rainy season in June. The objects sought are to get the coarse straw rotted and the weed seeds—wild oats, lamb's quarters, wild buckwheat and others such as stinkweed and blue burr—rotted or germinated. If the manure were piled in a dry place it would require

too long a time to secure these objects. From this pile, when rotted, the manure is spread on grass land or on land to be summer fallowed by means of the manure spreader at the rate of 6 to 8 tons per acre at such times as most convenient to do so—usually after threshing. In fall and early winter manure that contains but few weed seeds is taken directly from the stables and spread on meadow or pasture land. This acts as a mulch, promotes more luxuriant

growth and when turned under for wheat, roots or corn, gives good results. We have to be careful on the prairies about turning down any material in fall or spring that will interfere with the rise of moisture to the growing crop. Coarse strawy manure turned under at such times will ruin the crop. In grain growing it is very necessary too, to have the surface free from weeds. Any strawy manure on the surface of grain fields

that would interfere with the efficiency of the harrow in eradicating these would prove a nuisance. As our present system of grain growing gives way to diversification and more grass is grown there will be little difficulty in using advantageously all our farmyard manures. More spreaders are being sold every year. We use an abundance of wheat straw to absorb as much as possible of the liquid manure.

BOYS' AND GIRLS' CLUB CONTESTS

PRINCE EDWARD ISLAND

BY J. E. McLARTY, RURAL SCIENCE DEPARTMENT, CHARLOTTETOWN

REALIZING the importance of boys' and girls' club work, the Rural Science Department of the Prince of Wales College organized among the boys attending the college a potato-growing contest. By permission our contest has been organized much along the same lines as the one that has been conducted in Carleton and Russell counties in Ontario for the past few years.

For this year the contest is confined to boys in attendance at the college, but it is expected that another year these boys will be able to organize similar contests in their own districts as a branch of the central organization.

The potato dealers on the Island are being asked to make up the prize money. It is very gratifying to say that so far all who have been approached in the matter have willingly contributed.

We plan to have our exhibition of potatoes in Charlottetown in the fall, when all the members will be present and organize for another year.

GIRLS' POULTRY CONTEST

We have also been able to organize a poultry raising contest among some of the girls in attendance at the Prince of Wales College. In this we are using eggs from approved flock of "Bred-to-Lay" Barred Rocks. The exhibition of poultry is to be held at the Charlottetown exhibition next fall, where valuable prizes will be offered.

It is our hope that these club organizations will radiate to every part of the province, all being linked up with the central organization at the Prince of Wales College.

NOVA SCOTIA

BY L. A. DEWOLFE, B.A., DIRECTOR OF RURAL SCIENCE SCHOOLS

ACTUAL contests among boys and girls in Nova Scotia have not been carried on. Instead, individual pupils have worked for exhibition prizes. That is,

the individual rather than the club has been the unit.

At all the county and provincial exhibitions we have a fairly extensive prize list covering all common vege-

tables, flowers, manual training, sewing, cooking and school nature work. Besides, local fairs follow a more limited list, depending on the generosity of citizens and business efforts of the children themselves.

The child produces the best exhibition material he can irrespective of his neighbour's efforts, and trusts to luck for results.

Following the trend of the provinces, however, we are this year for the first time organizing clubs to enliven local interest. The accompanying prize offers indicate the scope of the work we are just now introducing. After all, there is no definite line of demarcation between the club offers and the regular exhibition offers.

THE FOLLOWING ARE THE OFFERS FOR 1917:

To the school children under 16 years of age who win prizes at a county exhibition, the Education Department offers the following bonuses, subject to the appended regulations:

1. To the boy or girl who wins a first prize at a county exhibition in 1917 for a pig, a calf, a lamb, or a pen of chickens, the Education Department will pay a bonus of \$5.

2. To the boy or girl who wins a first prize for a potato plot, a turnip plot, a mangel plot, or a grain plot, the Education Department will pay a bonus of \$5.

3. To the girl who wins a first prize in garment making, cooking, or canning, the Education Department will pay a bonus of \$5.

REGULATIONS

1. The exhibitor must have taken all care of his pigs, calves, or lambs, after they are four weeks old. He cannot exhibit chickens unless he has taken charge of all work after the eggs for hatching were procured.

2. The potato, turnip, mangel, and the grain plots must each be, at least, 300 square feet in area. The prize is to be awarded for total production of the plot. The ground may be ploughed and harrowed for the exhibitor; but, after that, he must do the work himself.

3. Girls' work will be judged according to the usefulness of her productions. Fancy work and expensive cakes will not receive highest consideration.

4. Every exhibit must be accompanied by an essay describing how the work was done.

5. Every exhibit must be accompanied by a parent's or teacher's certificate that the work was done by the exhibitor.

6. No bonus will be paid unless the judges declare that the exhibits were of a high order or unless competition was reasonably keen.

MACDONALD COLLEGE

BY J. EGBERT MCOUAT, B.S.A., DEMONSTRATOR TO RURAL SCHOOLS

MACDONALD College organizes and carries on most of its work in connection with the boys and girls of the province of Quebec through the medium of the school fair. No actual clubs exist in so far as they are related to this institution.

All contests are held in connection with the school fair. These competitions may be divided into two main divisions, the first embracing agricultural, and the second, domestic products.

AGRICULTURAL PRODUCTS

During the winter months the names of all pupils who wish to receive seeds and eggs are obtained either by visiting the schools or sending circulars to the teachers. Each child is allowed to receive one sample only. This year the following materials were distributed:—eggs, barley, oats, grain, corn, ensilage corn, swedes, potatoes, flowers, tomatoes and sweet corn. About 5,000 children are receiving one or other of these materials. The pupils are furnished with printed directions out-

lining the best methods of sowing and caring for the seed, which is always grown in plots at home. As a rule, the plots are visited during the summer and judged. Prizes are awarded to the scholars having the best potato, corn plots, etc.

The children exhibit the produce from these plots at the fair in the fall. At some of these fairs as many as 30 schools compete—at others only five or six. The smaller fair proves the more satisfactory in many ways, but lack of help often necessitates holding larger fairs.

DOMESTIC PRODUCTS

The School of Household Science, Macdonald College, must receive great credit for introducing into school fairs a uniform and complete system of sewing and cooking competitions. A schedule has been drawn up by them which is being followed at all fairs this year as closely as circumstances will permit.

This schedule gives all girl pupils, young or old, a fair chance to cook or sew and show their exhibits at the fair. All sewing is done according to patterns or directions which are furnished to each teacher by the school. In the cookery competitions all cake and bread must be made according to the same recipe. Bulletins outlining the best methods of cake and bread making, also giving the recipe to be followed, are supplied each pupil who wishes to compete.

Pupils are also given an opportunity to exhibit canned fruit and vegetables. A bulletin specially prepared by the Household Science school for such work has just been completed and outlines the latest and best methods. This pamphlet is also distributed to those competing.

The benefit of having only one kind of exhibit to judge at the fair is too

obvious to need comment. Below is given a brief summary of the domestic competitions which will be taken up at many of the fairs this year:

SEWING

- Group I—Girls, 8-10 years: knitted wash-cloth.
- Group II—Girls, 10-12 years: doll's kimona.
- Group III—Girls, 12-14 years: nightgowns.
- Group IV—Girls, 14-16 years: kitchen apron.
- Group V—Girls, any age (a) one pair of socks; (b) one pair of mittens.

COOKING

- Group I—A. Girls, 9-12 years: plain standard cake—without icing.
B. Girls, 13-16 years: plain standard cake—without icing.
- Group II—Girls, 14-16 years: one loaf of home-made bread.
- Group III—Girls, any age (a) two kinds of canned fruit, 1 pt. jar of each; (b) two kinds of canned vegetables, 1 pt. jar of each.

INFLUENCE OF THE HOME-MAKERS' CLUBS

The home-makers' clubs, organized by Miss F. Campbell of the Household Science school, do a great deal to assist in carrying out the school fairs, and, in some cases, have made themselves responsible for seeing that they were held.

Some of these fairs are held co-operatively with the provincial demonstrators, and some are held under the direct auspices of Macdonald College. This year the Department of Agriculture has seen fit to give liberal grants towards all fairs and the work, thanks to this assistance and the co-operation of school boards, demonstrators and others, promises to excel the effort of previous years.

MANITOBA

BY S. T. NEWTON, B.S.A., DIRECTOR OF EXTENSION WORK

THE boys' and girls' club work in Manitoba for the year 1917 includes 12 contests as follows:—Manual training; grain growing (boys 15 to 20); pig, calf or colt raising; the farm and home garden; poultry raising; cookery; garment making; canning and preserving; noxious weeds; dairy contest; flower growing, and essay writing.

In the manual training contest 25 projects are included, consisting of milking stools, bag holders, chicken brooders, exhibition crates, bird houses, and other articles useful on the farm. During the summer vacation 18 or 20 two weeks' short courses will be held out in the country when the boys, under careful instruction, will be taught to make a large number of these articles with the tools which are available on the home farm and such material as can be obtained locally.

For the grain growing contest registered seed will be supplied to the first 800 boys who apply and comply with the conditions under which the contest is carried on. Each will receive sufficient grain of any one of the following kinds,—wheat, oats, rye or corn, to sow one-half acre, provided five boys in the one neighbourhood each decide on the same kind of grain, or 10 for the whole central club.

Those who enter the pig raising contest are recommended to secure a pair of pigs from an owner who raises good pure-bred or grade animals, and the same is true in the calf and colt raising phases of this contest.

For the potato growing contest 10 pounds of registered seed is supplied free to each contestant who otherwise procures or selects 20 pounds of good seed. The idea in this contest is to demonstrate that careful selection is of even greater importance than the variety.

In the home garden work each

contestant is required to do all the work himself, except that he may hire some one to do the ploughing. He must plant at least six varieties of vegetables, keep accurate records, and can at least four jars of vegetables. Potatoes, peas and beans, which are supplied free, will constitute three of the varieties.

In the poultry raising contest each member is expected to secure two settings of eggs either from breeders of pure-bred stock or that which is of a particularly desirable variety. A dozen eggs will be supplied to each member in newly organized clubs.

In the cookery contest one of the rules is that each contestant must at least bake 15 loaves in the three months preceding the contest and exhibit two loaves at the fair.

In the garment making class each girl must herself make a garment, exhibit it, and write an essay on garment making.

The canning and preserving contest is connected very closely with the home garden work, and is planned to encourage boys and girls in the canning of vegetables, fruits, meats and so on which are now used in large quantities in the canned form even in rural districts.

In organizing clubs, particular emphasis is placed on gardening and canning, and a very large number have enrolled in both with the idea of helping to provide food for the nation at this time. Without the canning work a large amount of food would be produced only to be lost by reason of there being no facilities for keeping it.

Each contestant in the noxious weed competition is expected to recognize the weeds classed as noxious in the Noxious Weed Act of Manitoba. In this the schools co-operate closely with the Manitoba Weeds Commission and the Weed Inspectors.

Seeds are supplied free in the

flower growing contests to those who engage in at least two other contests. It is recommended that in addition to flowers in bloom, local clubs should offer prizes for the foliage or perennial flowers or flowering shrubs suitable for Manitoba culture, because at the time the boys' and girls' club fairs are held most of the flowering blooms have ceased to bloom.

The enrolment at this date, March 17th, is particularly gratifying, the number enrolled in each contest being

as follows:—manual training, 1,146; grain growing, 1,072; pig raising, 1,415; colt raising, 310; calf raising, 619; gardening, 4,810; poultry raising, 4,200; bread baking, 1,930; garment making, 2,371; canning and preserving, 1,570; essay writing, 3,420. In general, two, and sometimes three, contests are taken by the one individual.

Short bulletins are being prepared on each contest and mailed out as soon as they are off the press.

SASKATCHEWAN

BY S. E. GREENWAY, DIRECTOR, EXTENSION DEPARTMENT, COLLEGE OF AGRICULTURE

IN the province of Saskatchewan there is as yet no co-ordinated effort with the sole object of promoting boys' and girls' club work. This work is being carried on more or less systematically by at least three organizations; the agricultural societies, the rural education associations, and by many of the municipal councils under the direction of the agricultural secretary or local field representative. The justification for the delay in getting the work under one management is to be found in the fact that everybody is already interested in the work, and up to the present time there has been no overlapping. There has been a natural development which it would seem wise to permit to go on for a while, at least, until the much-disturbed social structure ceases to be at the beck and call of war, and more men are available to carry it on as it should be carried on.

The 120 agricultural societies in the province have been increasingly alive to the need of special work among the boys and girls. At the last annual convention held at the College of Agriculture in January a very lively discussion was devoted to the work and a resolution passed that it be co-ordinated under the management of the director of agricultural extension.

The societies plan this year to offer prizes for classes of horses, cattle, sheep, swine and poultry in which only juveniles will be allowed to compete. These classes will be judged either at the summer fair or at junior fairs held under the auspices of the societies later in the season. Selections will be made from among the prize winners for the boys' camp at the Regina summer exhibition in future years. The camp will be limited this year to 300 boys, who will be under camp discipline and will receive instruction in topics touching the work of the exhibition. The societies are featuring the work of school fairs this year, and are endeavouring to interest the trustees and pupils in school gardening, calf and pig raising, and the raising of poultry and vegetables. An effort is being made to keep the competitions from covering too much ground at first. There is a possibility that the solution of the boys' and girls' club idea may best be found in this gradual growth, as it exists in this province.

The work thus far has been largely the outgrowth of the plan of providing live stock and field husbandry lectures at 50 to 100 seed fairs each winter, and giving the lecturers opportunities of addressing the pupils at the public and high schools.

ALBERTA

BY E. S. HOPKINS, DEPARTMENT OF AGRICULTURE

THE work which the Alberta Department of Agriculture is undertaking this year with children can scarcely be classified under the heading, "boys' and girls' clubs". It may more accurately be termed home gardening for school children, because it confines itself chiefly to garden work with boys and girls in rural schools. This system possibly more so than the clubs affords an opportunity for very close supervision without which requisite educational work becomes very ineffective. Moreover, it enlarges the possibilities for uniform and permanent enrolment to the schools of agriculture.

Last year the work was started in about 93 schools; this year, while it is yet impossible to estimate the number accurately, it will probably include about 150 schools. The pupils in these schools will be given vegetable, field root and flower seed which they will plant in a plot at home. The boys must take potatoes and may take in addition any four of beets, carrots, parsnips, peas, mangels and turnips; the girls must take flowers and may also take in addition a choice of any four of the above mentioned vegetables. Five sittings of eggs are distributed to the pupils in each school; all the eggs given to all the schools in each district are from one breed of poultry.

As THE AGRICULTURAL GAZETTE goes into the hands of a large number of men employed in professional agriculture, a frank expression of all the facts may promote our mutual welfare. It must be said that the distribution of the eggs was the most unsatisfactory or at least the most unpleasant feature of last year's work. Pupils who were unsuccessful in securing a good hatch, no matter from what cause, invariably complained of the inferior quality of the eggs. Now enthusiasm and op-

timism are necessary in dealing with children and special effort should be made to insure a good hatch. Eggs secured locally hatched on the average better than the eggs shipped some distance; possibly supplying day-old chicks, though it has some defects, might obviate this difficulty.

In the summer, fairly close supervision is exercised over the pupils' work. A number of visits are made to the schools before the vacation commences and one visit is made to the home of the pupil to see the plot and to discuss the work with him (or her) and with the parents.

In the autumn a fair is held at which the pupils exhibit the products of their summer's work. Last year these fairs were held at the schools of agriculture at Claresholm, Olds and Vermilion and at Argyle, Sedgwick and Stony Plain; this year there will be a larger number of fairs. Five of the school fairs held last year were held alone as separate fairs; one was held in conjunction with the local fair of the agricultural society. It is difficult to decide which is the wiser plan; the former concentrates all the attention on the school work and consequently promotes it more effectively, but the latter ensures a larger attendance and gains the co-operation of the members of the agricultural society, and many of whom are the best men in the district.

Other classes at the fair include sheaf and threshed grain, calves, colts, sewing, cooking and school collections of weeds and insects. Two classes which will be dropped this year are (1) regular school work such as writing, drawing maps, reed and raffia work, and (2) gopher tails. The former class lies somewhat beyond the province of agricultural work, while the latter class, though aiming at a splendid object—to exterminate the gophers—tends to induce fraud, some exhibitors being

known to store their collection from one year to another, thus discouraging others from attempting to make any collection. Addresses are delivered at the fairs by men from the departments of Education and Agriculture and a musical programme and sports are also arranged.

The work is a success. Many persons have written asking that it be extended to their localities and while the policy of the Department is to make extensions as rapidly as it can, it is firmly resolved to limit it to an amount which can be supervised by properly trained men.

BRITISH COLUMBIA

IN 1914, the British Columbia Department of Agriculture organized and conducted boys' and girls' potato-growing competitions. The results were so gratifying that they were continued in 1915 and 1916. During the present year the work among the boys and girls is being extended and greater results than heretofore achieved are confidently expected. Five competitions as follows are open to the members of boys' and girls' clubs organized within the province: —

- (1) Potato-growing.
- (2) Corn-growing.
- (3) Pig-raising.
- (4) Poultry-raising.
- (5) Calf-raising.

Any boys' and girls' club electing to conduct any one of the competitions must have at least six entries. Where a club wishes to take part in two competitions, it must have 20 or more active members and, at least, 8 entries in each competition, and no member is allowed to take part in more than one competition.

In the potato-growing and corn-growing competitions the plots entered must be one-tenth of an acre in size. An accurate financial statement showing expenses, returns, and profits must be made in every case by each competitor, using the following scale of charges:

Rent of land.....	\$10 per acre
Each horse.....	20c. per hour
Each man.....	30c. "
Each boy and girl.....	15c. "
Stable manure, per two-	

horse load delivered on the land.....	\$ 2
Each irrigation.....	20c.

In addition every competitor is required to give the actual cost of fertilizer other than stable manure used, seed, spray material, lumber, fencing, feed, etc. Where possible the boys and girls will be notified of the date of the judge's visit so that he may meet and talk with them. A note-book will be supplied to each competitor so that a record may be made of the work accomplished, the feed supplied and the money paid out.

The provincial Department of Agriculture, in addition to supplying the judges will offer the following prizes: In competitions 1, 2 and 4, \$5, \$4, \$3 and \$2; in competitions 3 and 5, \$7, \$5, \$4 and \$3. When there are eight competitors four prizes will be awarded, when six only three. Provincial sweepstakes are also to be established, the winners being the boys and girls scoring the highest number of points in the different competitions, who will have the choice as prizes of (1) a pure bred pig, (2) a pen of pure chickens and (3) a set of agricultural reference books.

The boys' and girls' club organizing and conducting the most successful competition or competitions, judged according to the total number of competitors, financial report and an essay, will receive from the Department of Agriculture a library composed of eight of the best agri-

cultural periodicals published, to be circulated among members of the club. Special prizes are offered for seed-potatoes and seed-corn grown by members as follows:—

Best 20 lb. of seed potatoes. . . . \$10, \$8, \$5
 Best 12 ears of fodder corn for
 seed. \$10, \$8, \$5

These exhibits are to be sent to the provincial seed fair either at Armstrong or New Westminster. The provincial Deputy Minister of Agriculture and the provincial Live Stock Commissioner each offer special prizes and local business men in the different districts it is thought likely will do the same.

QUEBEC

THE CO-OPERATIVE MARKETING OF LAMBS

THE co-operative marketing of lambs, started last year by five wool-growers' and sheep-breeders' associations, proved such a success that considerable expansion of the movement has been planned. The official report just issued states that 2,567 head, which sold for \$21,498.82, were graded and fetched an increase of prices ranging from 5 to 15 per cent. The lambs graded like this: 47.1 per cent No. 1's; 17.1 per cent No. 2's; 9.9 per cent No. 3's; 17.2 per cent as ram lambs and 8.8 per cent as aged ewes. Although the breeding varied, the class was fairly uniform. The grades established were: Lambs—No. 1's, 70-100 lb. in weight; No. 2's, 100 lb. and over; No. 3's, 70 lb. and under; ram lambs, all weights. Aged Sheep—No. 1's, 100-140 lb. in weight; No. 2's, 140 lb. and over; No. 3's, 100 lb. and under; aged rams, all weights.

Two sales were held, one the last part of August and the first days of September and the other in October

and November. The highest price obtained was \$10.25 and the lowest \$8 per cwt. In the August-September sales 365 No. 1 lambs sold at an average price of \$9.26 per cwt. and averaged \$7.48 per head; 205 No. 2 lambs sold at an average price of \$9.07 per cwt. and made an average of \$9.64; 87 No. 3 lambs realized \$8.52 per cwt. and averaged \$5.11 per head; 41 aged ewes sold for \$5.86 per cwt. and averaged \$7.67 per head. In the October-November sales, 846 No. 1 lambs sold for an average of \$9.43 per cwt. and averaged \$8.10 each; 234 No. 2 lambs made an average of \$9.21 per cwt., and brought \$9.85 each on the average; 159 No. 3 lambs sold at an average of \$8.70 per cwt., and an average of \$5.41 each; ram lambs brought an average of \$9.07 per cwt., and averaged \$8.78 each, while 187 aged ewes sold on the average for \$5.94 per cwt., and realized an average of \$9.01 per head.

ONTARIO

RECENT AGRICULTURAL LEGISLATION

FIVE measures relative to agriculture and the land were adopted at the recent session of the Ontario Legislature. Three of these were the Farm Loans Act 1917, The Returned Soldiers' and Sailors' Land Settlement Act and the Department of Agriculture Act, 1917. The other two were an Act to amend The Dairy Standards Act and an Act to amend The Tile Drainage Act.

THE AMENDING ACTS

The amendment to the Dairy Standards Act, passed last year, accedes to the request of the Eastern Ontario Dairymen's Association and many other provincial bodies, in providing that the Act, instead of coming into force on March 31st last, as originally decreed, shall pass into law on a day to be fixed by proclamation of the Lieutenant-Governor in Council. This measure provides for the grading by Babcock test of milk and cream supplied to factories and for payment of the same according to the grade. While the enforcement of the Act is thus postponed, educational work along its lines is proceeding.

The amendment to The Tile Drainage Act permits a township to loan to individuals for purposes provided for in the bill funds of money not exceeding in the aggregate \$100,000 instead of \$50,000, as previously enacted, and allows the province to loan to municipalities a total of one million dollars instead of \$500,000.

THE DEPARTMENT OF AGRICULTURE

The Department of Agriculture Act, 1917, authorizes the Lieutenant-Governor in Council, if he think fit, to appoint more than one Deputy

Minister of Agriculture, a Commissioner of Agriculture, and such other officers and clerks as he may deem necessary for the proper conduct of the business of the Department. The duties and relative standing of the Minister and of the officers so appointed are defined.

THE FARM LOANS ACT

Clause 3 of The Farm Loans Act reads:

(1) The treasurer may loan money from time to time to the municipal corporation of any township upon the debentures of the township issued as hereinafter provided for the purpose of enabling the corporation of a township to advance money repayable by a special rate upon land held and used for farming purposes in the township.

(2) Every such loan shall be for the erection of buildings and machinery, fencing, draining, clearing and other permanent improvements approved by the regulations or for such other purposes in aid of the farming industry as may be approved by the regulations, but not more than one-half of any such loan shall be for any other purposes than permanent improvements.

The municipal council desiring to avail itself of the provisions of the Act can pass a by-law or by-laws in the prescribed form for borrowing the money from the provincial Treasurer and for issuing debentures to meet the liability thus incurred. Four weeks' notice in a local newspaper must be given of the meeting to be held for the passing of such by-law or by-laws. Inspectors are to be appointed as required. Any owner of lands in fee simple, used for farming purposes in the township, can apply for a loan. A statutory declaration must accompany the application. Applications must be considered in the order received. The inspectors are required to report on the

applications and, subsequently, to certify that the loans have been used for the purpose for which they were granted. Interest on debentures to meet the loans must be fixed by the Lieutenant-Governor in Council. The by-law must provide for the levying of an annual special rate upon the lands therein described during the currency of the debentures to provide for the amount annually payable thereon, and such rate is to be levied and collected and may be recovered in the same manner as other taxes due to the municipality.

The Council can make temporary advances to applicants out of the municipal funds. Copies of the by-law must be forwarded to the provincial Treasurer and to the Registrar of the district or to the Land Titles Office. The loan is repayable as provided in the regulations and is not to exceed 60 per cent of the assessed value of the land upon which it is issued. The rate of interest is set at 5 per cent per annum. The corporation is to have an insurable interest on the property or land involved. In addition to any other remedy which the corporation of a township may have for the recovery of moneys loaned under this Act, where default in payment of any sum due in respect of a special rate imposed under this Act continues for a period of three months, the whole amount borrowed, with interest thereon at the rate of 7 per cent per annum, becomes due and payable, and the corporation can take such proceedings for the sale of the lands described in the by-law imposing the rate, to satisfy the lien of the corporation, and can ap-

ply the proceeds of such sale in such manner as is prescribed by the regulations.

Debentures under the Act are payable on the first day of January. The Provincial Treasurer is authorized to recover debts incurred by corporations as provided for by the Municipal Act. The Lieutenant-Governor in Council is authorized to make the necessary regulations. The Act comes into force by proclamation.

RETURNED SOLDIERS' AND SAILORS' LAND SETTLEMENT ACT

The Returned Soldiers' and Sailors' Land Settlement Act is to be taken as part of the Northern and Northwestern Ontario Development Acts and is to be administered by the branch of service created by those Acts. Expenses of administration are to be met out of appropriations provided by the same Acts. The Lieutenant-Governor in Council is given power to appropriate or set apart any territory required for reservation for persons who have enlisted for active military or naval service overseas since August 4th, 1914. On recommendation of the Minister, the Lieutenant-Governor in Council is also authorized to make regulations for carrying out the purposes of the Act. These purposes include advances, if required, for the purchase of land, stock and farming implements.

APPROPRIATIONS FOR AGRICULTURE

Following is a table of the appropriations, including on capital account, made for agricultural purposes in 1916 and 1917:

	1916	1917
Civil Government, Printing Reports and Bulletins, Statistics, Miscellaneous.....	70,675	81,116.66
Agricultural College.....	335,141	329,567
Agricultural and Horticultural Societies.....	163,950	164,475
Live Stock Branch.....	50,647.24	58,350
Institutes Branch.....	41,072.24	41,375
Dairy Branch.....	64,150	144,547.30
Fruit Branch.....	62,325	85,475
Ontario Veterinary College.....	33,893.07	33,228.83
District Representatives.....	80,600	80,600
Demonstration Farm.....	10,000	8,000
Totals.....	\$912,453.55	\$1,026,734.79

SUPPLEMENTARY ESTIMATES

The supplementary estimates passed at the recent session for agricultural purposes were:

To pay Dr. G. C. Creelman for special services.....	\$1,416.66
To provide for salaries of Assistant Commissioner, stenographer and office help.....	3,700.00
To provide for travelling expenses, advertising, printing, postage, stationery and contingencies, office of Commissioner.....	2,000.00
Ontario Agricultural College.....	16,245.00
Horticultural Experiment Station, Jordan Harbour (cottages for help, greenhouse for experimental work and canning factory for testing by-products and putting up fruit for overseas).....	28,175.00
Live Stock Branch.....	7,200.00
Dairy Branch (including \$80,000 to purchase dairy products for grading purposes and to meet expenses in connection therewith).....	80,200.00
Fruit Branch.....	1,400.00
Macdonald Institute and Hall.....	1,000.00
Animal Husbandry, Farm and Experimental Feeding Department.....	600.00
Experimental Dairy Department.....	1,300.00
Poultry Department.....	2,533.00
Department of Horticulture.....	998.00
Ontario Horse Breeders' Association, grant.....	500.00
Canadian National Exhibition (agricultural exhibits, additional).....	500.00
Trees, plants, seeds, etc., Horticultural Department, Ontario, Agricultural College.....	600.00
Miscellaneous.....	576.13
Total.....	\$148,943.79

WOMEN'S INSTITUTE WORKERS IN CONFERENCE

WOMEN'S Institute workers gathered in force in the Private Bills Committee room, Parliament Buildings, Toronto, on April 24th and 25th, 1917, at a conference to consider the advancement of production and war work. Mr. Geo. A. Putnam, provincial Superintendent of Women's Institutes, outlined the object of the conference, at the same time pointing out directions in which patriotic effort could best be bent. In a special reference to the home garden he said that the Department had a four-fold purpose: First, to encourage a greater production of vegetables. Second, to induce our people to grow a greater variety of vegetables and give them a more important place in the menu. Third, to couple with this, methods of preserving and storing which will insure a liberal supply the year round. Fourth, as a means of attracting and holding the younger women and girls in the Institute. He announced that 2,464 persons in 270 branches

were putting in gardens according to plans furnished.

Dr. Creelman, Commissioner of Agriculture, after a reference to the shortage of farm labour, pointed out the importance of using pure seed, of raising all the young stock born on the farm, especially calves and lambs, of doubling the poultry output, and of encouraging the home consumption of apples.

No fewer than 28 speakers addressed the conference and the following resolutions were passed:—

Be it resolved, that we recommend the voluntary adoption of stated weights of staples per capita per week in sugar, meat, flour.

We also ask for one meatless day each week.

We further recommend the utilization of the entire Canadian apple crop, by the employment of the fresh fruit by canning, drying, or in the manufacture of apple butter or sweet cider.

Further we suggest that calves (exclusive of males of dairy breeds) and lambs be not slaughtered for food for the sake of the conservation of meat, leather, and wool needed for army supplies.

MANITOBA

GOPHER WEEK

DURING the first five days of May the gopher contest organized by Professor V. W. Jackson of the Manitoba Agricultural College was conducted with great success.

The first four days of May the school children of 300 schools competing in contest number one for cash awards by the Manitoba Department of Agriculture, brought in over 60,000 gopher tails, an average of 200 per school. The Errol school, Lenore, won first place with 1,642 tails; Cherry school, McAuley, second, with 1,083 tails.

Then on Saturday, May 5th, several other contests for those not attending schools as well as those in attendance were put on, and the reports for that day alone account for 9,672 gophers.

The two figures make a total of

close to 70,000 gopher tails actually counted. These were all adult gophers taken before producing their young. In Manitoba the gophers rear two broods per year, and it is estimated that each pair taken at the beginning of May is as good as 15 gophers killed in June or July. On this basis, and especially in view of the fact that about one-half of the gophers shot escape down the holes to die, Professor Jackson estimates that the week's work was as good as killing more than half a million gophers in midsummer.

For individual shooting in one day Alex. Henry, aged 14, Rapid City, and Alex. Henderson, aged 16, Deepdale, take the palm. They accounted for 386 and 375 gophers respectively. One school teacher, Mr. Janzen, Morden, got 197 gophers in a day, and two Glenboro girls shot 141 and 132 gophers respectively on May 5th.

RECENT AGRICULTURAL LEGISLATION

AT the session of the Manitoba Legislature for 1917 eight new Acts and four amending Acts relating to agriculture were passed. The first of these is an Act respecting agricultural societies, cited as "The Agricultural Societies Act." The measure is intended to regulate existing societies and to provide for the orderly organization of new societies. Relative to the latter it is decreed that no new agricultural society shall be formed within 15 miles of an existing society that is calculated to affect the welfare of the society. Before a new society can be organized an application in due form must be filed with

the Superintendent of Agricultural Societies signed by at least 60 persons over 18 years of age, each of whom must have subscribed one dollar to the funds of such society. The Act also provides for a legislative grant of one dollar for each member up to 200 if the society engages in any of the following activities: summer or fall fairs, seed grain fairs, ploughing matches, good forming competitions, standing crop competitions, horticultural shows, live or dressed poultry shows, holds at least five institute meetings, summer fallow competitions, encouragement of pure bred live stock. If a society expends \$150 in prizes at

an exhibition or for a competition a grant equal to 60 per cent is to be made. A grant of \$50 is to be made for every registered stallion, \$20 for every registered bull, \$10 for every registered boar and \$10 for every registered ram owned and maintained by the society for at least 9 months of the year. A grant of one third is to be made of the amount expended on agricultural or horticultural periodicals, but not to exceed \$15. To each society holding at least five meetings for the purpose of disseminating agricultural knowledge a grant of half the expenses incurred for engaging speakers up to \$25 is to be paid.

The Cattle Brand Act is amended regarding the allotments and cancellations of brands.

DEMONSTRATION FARMS ACT

An Act to be known as "The Demonstration Farms Act" provides that upon the authorization of the Lieutenant-Governor in Council, the Minister of Agriculture, may purchase, establish, equip and maintain demonstration farms at such places in Manitoba as are deemed advisable. The Minister is also given power to employ and fix remuneration of all officers and employees necessary for the maintenance and operation of such farms, and to designate the duties of each officer and the reports which are to be made by the officers and employees.

THE MANITOBA FARM LOANS ACT

An Act designed to foster and encourage agricultural development by providing for loans upon farm mortgages at reduced rates of interest is to be known as "The Manitoba Farm Loans Act". It calls for the establishment of The Manitoba Farms Loans Association to be administered and managed as the Act provides. The association is to be managed by The Manitoba Farm Loans Board consisting of five mem-

bers appointed by the Lieutenant-Governor-in-Council, one of whom is to be known as Commissioner of Manitoba Farm Loans. The capital stock of the association is a million dollars, divided into two hundred thousand shares of five dollars each. The shareholders are to be the borrowers. The province is authorized to subscribe for 50 per cent of the capital stock and to advance to the association a sum equal to the remainder of the paid-up capital. For these purposes the whole total of one million dollars has been appropriated by the legislature. The rate of interest is to be sufficient to pay the interest on the securities issued to provide the funds required plus one per cent to meet running expenses. No loan is to exceed fifty per cent of the value of the property mortgaged or to be for more than \$10,000.

INSECTIVOROUS BIRDS ACT

An Act for the protection of Insectivorous and other birds beneficial to agriculture prohibits the trapping, wounding or killing of bobolinks, catbirds, chickadees, cuckoos, flickers, flycatchers, grosbeaks, hummingbirds, kinglets, martins, meadowlarks, nighthawks, or bull bats, nut hatchers, orioles, robins, shrikes, swallows, waxwings, whippoorwills, woodpeckers, wrens or any other perching birds which feed chiefly on insects. Auks, auklets, bitterns, fulmars, gannets, grebes, guillemots, gulls, herons, jaegers, loons, murres, petrels, puffins, shearwaters and terns, or any other game bird, whether resident or migratory, can only be shot, killed or taken on conditions provided in the Act. Eagles, falcons, goshawks, sharp-shinned hawks, duck-hawks, pigeon-hawks, coopers or chicken-hawks, crows, ravens, blackbirds, rusty grackle, purple grackle and English sparrows are not protected.

The Noxious Weeds amendment Act is dealt with elsewhere in this number of THE GAZETTE.

RURAL CREDITS ACT

The Rural Credits Act provides for the organization by Manitoba farmers of rural credit societies, through which the individual shareholders of such societies may be enabled to secure short term loans for carrying on or extending their farming operations. Such loans will be secured on the security of the crop for the production of which the loan is secured, or the live stock or the machinery bought with the money thus borrowed. The money will be secured from the bank at 6 per cent and the borrower will be charged 7 per cent, the difference going to pay expenses of the society and augment the guarantee fund.

An amendment to The Seed Grain Act, passed in 1913, repeals Section 3 of that Act, and substitutes another section providing for the filing at the Dominion Lands office in Winnipeg mortgages made for the repayment of advances made by the Dominion Government and for the notification to registrars and

district registrars of such advances.

An Act to enable Municipalities to borrow limited amounts of money for seed grain purposes authorizes the issue of debentures for such purposes at a rate of interest not to exceed 6 per cent.

An Act for the protection of sheep provides that any person may kill any dog which he sees pursuing or wounding any sheep. The owner of a sheep killed by a dog can recover a sum not exceeding \$50 from the owner of the dog. If the owner of the sheep cannot recover after a police magistrate has decided in his favour the municipality is to pay two-thirds of the amount to the aggrieved party.

The Threshers Lien Act is amended by adding the cost of fuel to the lien.

APPROPRIATIONS FOR AGRICULTURE

The following appropriations were made by the legislature for agricultural purposes:

Salaries	\$14,600.00
Supplies and Expenses.	2,000.00
Agricultural and Statistics	103,050.00
Agricultural College	191,370.00
Immigration	45,000.00
Publicity (Agricultural Publications).	22,800.00
Protection of Game	35,000.00
Miscellaneous (including hospital and charity grants).	175,560.75
Total	\$589,380.75

DAIRY STAFF APPOINTMENTS

IN the Dairy Branch of the Manitoba Department of Agriculture two important appointments have recently been made.

The position of Dairy Commissioner has been filled by the promotion of Mr. L. A. Gibson to occupy that place. Mr. Gibson has been fourteen years in the Canadian West, and before that time he had six years



MR. L. A. GIBSON
Recently appointed Dairy Commissioner by the
Manitoba Government

experience as factory manager in Eastern Canada. In the West he was first engaged in Saskatchewan as creamery manager under the Dominion Government; and, later, came to Manitoba, where he has had a very wide experience not only in connection with important commercial dairy concerns but also as creamery inspector, secretary of the Manitoba Dairymen's Association, member of the dairy staff of the Agricultural College and later, as dairy produce grader for the province.

Another important appointment just made is that of Mr. John A. McDonald, who is severing his long connection with the Dairy Branch of Saskatchewan to join the Manitoba Dairy Branch. Mr. McDonald has been in dairy work in Saskatchewan since 1904, before which time he had about eight years' experience in cheese and butter making in Eastern Canada.

Mr. W. J. Crowe and Mr. I. Villeneuve, of the Government dairy service of Manitoba, will continue their work of instruction and inspection among the creameries and cheese factories respectively, and as especial attention will this year be given to cream grading and the attainment of a uniform quality of output, the prospects for a successful season's dairy work are the brightest.

Waste in any individual household may seem to be insignificant, but if only a single ounce of edible food, on the average, is allowed to spoil or be thrown away in each of our 20,000,000 homes, over 1,300,000 pounds of material would be wasted each day. It takes the fruit of many acres and the work of many people to raise, prepare, and distribute 464,000,000 pounds of food a year. Every ounce of food thrown away, therefore, tends also to waste the labour of an army of busy citizens.—*United States Secretary of Agriculture.*

SASKATCHEWAN

AGRICULTURAL RETURNS

VARIOUS methods of gathering statistics of live stock and seeded acreages have been followed in Saskatchewan since the Department of Agriculture was organized in 1898. In the early years threshers furnished data regarding crop acreage and yields, and crop correspondents gave percentage estimates of live stock, which were supplemented by inspectors' reports of shipments. The extensive development of the province necessitated a departure a few years ago from these methods, none of which, however, proved entirely satisfactory. The Dominion Government, meanwhile, issued annual estimates of crop acreage and live stock, and these figures were checked up every five years by the quinquennial census. The 1916 census revealed a startling error in the crop estimates of both the Dominion and Provincial Governments, and the need which had been felt for some time for better methods was sharply emphasized. Mr. R. H. Coats, Dominion Statistician, and chief of the Dominion census, recently visited Regina to confer with the provincial authorities respecting methods of improving the statistical services of both Governments, and in this connection he is visiting all the Provincial Governments of Canada. The decision reached with respect to the annual estimates of crop acreage and live stock so far as Saskatchewan is con-

cerned is that the Dominion Government will provide 75,000 statistical schedules to be mailed to the school teachers by the provincial Department of Agriculture. The schedules will be in the hands of the teachers about the first week in June, and will be handed to the pupils from farm homes about June 8th, to be completed and returned not later than June 15th, and forwarded to the Census and Statistics office at Ottawa for compilation. The data contained on 75,000 cards will furnish an average for the whole province almost as correct as a complete census, and with much less labour. The vital part of the scheme is the ascertaining of the total number of farms in Saskatchewan, and each teacher will be asked to state the number of occupied farms in each school district. This information will probably be obtainable only from the secretary-treasurer of the school district. An accurate check on this, however, will be furnished by the census record of 1916.

As this data will not be available for publication until some time in July, both the census office and the provincial Department of Agriculture will gather such data as is available, and will issue jointly an estimate of crop acreage in June. The final figures, however, will be obtained from this special inquiry, with the assistance of the school teachers of Saskatchewan.

THE BETTER FARMING TRAIN

THE Department of Agriculture, with the co-operation of the College of Agriculture and of the two railways, will run a Better Farming Train over Grand Trunk

Pacific lines from June 4 to 16, and over the Canadian Pacific Railway lines in the south-eastern portion of the province from June 18 to 30, stopping at 24 places on each line.

Amongst those who will accompany the train and assist in its work from time to time will be: Dean Rutherford; John Bracken, Professor of Field Husbandry; A. M. Shaw, Professor of Animal Husbandry; A. R. Greig, Professor of Agricultural Engineering; R. K. Baker, Professor of Poultry Husbandry, all of the College of Agriculture, and F. W. Bates, Director of School Agriculture. Mrs. R. Archibald will be in charge of the women's section of the train, and will be assisted in lecturing and demonstrating in household science by Miss Gladys Henry.

The train will be divided into six sections. The live stock section will consist of three cars of carefully selected live stock, with a covered car to be used as a platform from which to display the animals. The field husbandry section will have a fine display of soil products, charts showing experimental work, an exhibit of birds and animals of the province which are beneficial to agriculture, and also a lecture car where the best

tillage methods will be dealt with by well-known authorities. In the boys' and girls' section a car will be devoted to the instruction and entertainment of the boys and girls, where illustrated lectures will be given on native birds and insects, noxious weeds, school gardening, and boys and girls contests. The household science section will have two cars, one for the lectures on cooking, laundering, sewing, nursing, etc., and the other a nursery car where the little ones will be cared for while their parents are visiting the train. The poultry section, with brooders and incubators in operation, will contain everything likely to hold the attention of poultry raisers, and lectures on these topics will be given in the household science car. The farm machinery section is to consist of two cars of mechanical exhibits. Special care has been taken to make this section as attractive and valuable as possible. Many practical ideas will be gained by examining these exhibits and attending the lectures.

ENCOURAGING PRODUCTION OF HIGH STANDARD MILK

DURING the last month the Dairy Branch took a step which, without increasing the price of milk, should have a great effect in encouraging the producers and also in protecting the consumers. Farmers who are shipping milk to the Dominion Dairy at Regina, will have a chance to earn a bonus on their produce by complying with certain conditions laid down by Mr. W. A. Wilson, Dairy Commissioner. The grading or classification of produce and a monetary return on the basis of service rendered as reflected in the quality of the goods has long been the policy of the Dairy Branch, for the reason that improvement can be effected more rapidly and per-

manently by giving tangible encouragement in this form. The classification of milk as now proposed offers a premium at the end of the season to any shipper who will furnish the Dairy Commissioner with a certificate from a qualified veterinarian showing that the herd had been tested for tuberculosis and that there were no reactors, and a further premium to those who, according to the city inspection score card, show a score of 75 points or over, the latter award to be made on the basis of the city inspection, as reported to the Dairy Branch. Farmers who comply with these conditions will be paid five cents extra on each pound of butter fat supplied during the season.

FARM LABOUR

THE campaign, as outlined on page 390 of THE AGRICULTURAL GAZETTE for May, 1917, to provide labourers for the farmers of Saskatchewan came to a successful conclusion on April 23, with the return of the last of the various agents sent out by the Bureau

of Labour to procure the necessary assistance for the farmers. As will be seen by the figures given below about 5,000 men have been secured. The statement issued by Mr. Molloy, secretary of the Labour Bureau, is as follows:—

POINT	Manitoba	Saskatchewan	Alberta
St. Paul	540	1,412	635
British Columbia	0	1,063	94
Duluth	71	193	72
Winnipeg	730	761	124
Grand Forks	300	800	400
Totals	1,641	4,229	1,325

These figures were up to April 17, and the following statement shows the farm labourers coming into the

West as reported by Dominion Government agents on April 15:—

POINT	Manitoba	Saskatchewan	Alberta
Spokane	0	200	1,100
St. Paul	477	1,298	581
Duluth	71	193	72
Grand Forks	300	800	400
Detroit	50	150	100
Totals	898	2,641	2,253

Owing to the timely efforts of the provincial authorities, farm labour has been provided for practically every farmer filing an application. The men secured by the provincial Government agents were all experienced farm hands, and no complaints have been received as to their capa-

bilities. The agents were: J. J. McGrath, at Watertown, S.D.; F. J. Kinnimond, at Grand Forks; R. H. Chadwick, at Des Moines; H. L. Lovering, at Milwaukee; J. S. Tullis and N. Gilmour, at St. Paul; E. Oliver and F. J. Fitzpatrick, at Duluth.

ALBERTA

THE COLLEGE OF AGRICULTURE

BY GEO. HARCOURT, B.S.A., UNIVERSITY OF ALBERTA, EDMONTON

THE scheme of agricultural education in force in Alberta is different from that which hitherto has been adopted in the various provinces and states of the continent.

Instead of having one central institution giving the whole course of instruction the work is divided between two related institutions. The first of these comprises a group of schools of agriculture (they might be called agricultural high schools) so placed throughout the province as to be within easy reach of farm boys. Here the first two years of a five-year course are given. This course is a very practical one, aiming to fit the boy as far as possible for his life work.

The second of these institutions is a college of agriculture in the provincial university, a central institution giving three more years of instruction leading to the degree of Bachelor of the Science of Agriculture. By being in the university, agricultural education is given its proper place and relation to other lines of general education and yet not subordinated to any.

THE SCHOOLS OF AGRICULTURE

Experience has shown that farm boys do not travel far from home to attend an agricultural college any more than they do to attend a high school, therefore it was thought possible to take the work of instruction closer to the farm. With this idea in view three schools were established and so placed that no student would be any great distance from home. Because of the proximity of the school it was hoped the boy would

keep fully in touch with his home life and that the home itself would become interested in the school and its work. It was not the idea to have these schools grow into big institutions, but as soon as need arose to establish similar schools in other districts so that the farm home and the school would be brought intimately in touch with each other.

These schools have now completed their fourth year and are no longer an experiment. They have amply demonstrated the soundness of the theory of their conception as they have rendered a service of outstanding value and have shown that this service has been appreciated by the people for whom they were instituted. Already the capacity of two of the schools has been outgrown in spite of the reduction in attendance made by the war, and this year two new schools will be established with the prospect of two more in the very near future.

After a close examination of the work of leading colleges on the continent a carefully planned course of study was adopted covering a period of five years. The first two years, or the work taken at the schools of agriculture, is made to conform, as closely as possible, to the associate diploma course given at most colleges. This course covers practically the whole field of agricultural education because it is designed to meet, first of all, the needs of the farm boy who can give only two years to this work. For this reason, also, special emphasis is laid upon the practical side so that the boy will be fitted, as far as is possible in a short course, for his life's work.

On the proper completion of the two years' course an associate diploma is awarded and an entrance standing given to the College of Agriculture at the provincial university.

THE COLLEGE OF AGRICULTURE

The College of Agriculture, or as it is sometimes called, the Faculty of Agriculture, was started in the spring of 1915, the course of study planned and staff organized to take care of the first class in the fall of that year. On account of its connection with the university some doubt has been expressed about the danger of the College of Agriculture losing its identity by being absorbed by the university. Those who make this criticism fail to realize that the word university in Alberta is really a general term covering the course of instruction given in a common building with a common equipment for a number of colleges. Alberta is fortunate in that she has been able to gather together in one institution most of the colleges of learning. In the university the word "faculty" is used for "college", but they are synonymous. Thus there are the faculties of arts and sciences, applied science, medicine, law, and agriculture, and schools of pharmacy and accountancy, each with its own staff of teachers and each controlling its own course of instruction. Each college does not have a president because there is a president for the university, so the head of the staff of teachers in each college or faculty is called a "dean". By linking up agricultural education with other lines of education, it is given its proper place and standing in the educational system of the province and not relegated to a separate existence as though it were something apart and not worthy to take a place in a general scheme of education.

Owing to the course given at the schools of agriculture being designed to meet the needs of those

who can take only a two-year course it naturally follows that when a student enters the College of Agriculture at the university for the third, fourth and fifth year's work, it will not be so much a study of new subjects that will be presented to him as a deeper study of, and a fuller examination into, those he has already briefly considered at the schools.

The course of study in field husbandry is framed to meet the needs of the growers of grain and forage crops, as these will always be important lines of work. This course goes fully into the growing, manuring and hybridizing of the various grains, grasses, forage and root crops. A laboratory in connection with this work has been established which is well worthy a visit from anyone interested. Here the students are required to make repeated tests such as seed germination, seed purity, percentage of hull, hardness and moisture content. A small beginning has been made in the matter of field plot tests which will be enlarged as rapidly as possible to a full experiment station project. Research work along these lines will also be undertaken as soon as it can be arranged.

Alberta is destined to be pre-eminently a live stock province. The factors which tend to make this so are well recognized—(a) favourable climate, (b) immense yields of grass, forage and root crops, (c) distance from markets. For this reason animal husbandry is found to be of paramount importance and the aim of the college is to give the students the latest there is on breeds and breeding, feeds and feeding, and to study in detail the economic principles involved in the live stock industry. The teaching of animal husbandry lends itself to the superficial and spectacular and a poor teacher can make the consideration of a fine animal very interesting because it is a fine animal, but it takes a good teacher to give the student the proper mental picture of what this animal

stands for as a type and as a result of years of intelligent selection in breeding. A good start has been made in laying a foundation for representative groups of the chief breeds of live stock and as rapidly as possible experimental work will be begun.

Closely associated with the rearing of live stock as a business proposition is the care of their health and consequently no course can be complete without a live up-to-date branch of veterinary science. Blemishes and diseases have taken their toll in Alberta as elsewhere and the College of Agriculture aims to give a particularly strong course in this branch. Through the courtesy of the large local packing plants students have access to condemned carcasses, thus enabling them to make a first-hand study of the different diseases and to see in a very practical way the relation of disease to the economic side of the industry.

Another line of study that opens up a wide scope for work is the soils department organized last year. As yet but little has been done along the line of investigating the various types of soils found in Alberta and their possibilities. The work in this extends over two years and begins with a course in elementary geology as a foundation.

Irrigation, drainage and roadmaking are three important problems facing the farmers of different sections of the province and it is only natural that they should look to the college for assistance in solving them. Who better can solve them than an agriculturist trained in engineering? It is, therefore, intended to offer in one year, at least, a strong course in engineering as it pertains to agriculture.

One hears a great deal these days about keeping boys on the farm, about the attractions of farm life and agricultural education, but after all has been said it must be admitted that the factor of chief importance in this big, wide question is the

economic one. Can farming be made to pay—and pay well? When some of the things at least that go to make life attractive for the boys and girls elsewhere are secured for the farm then there will be no difficulty in keeping them on the farm. Consequently the college gives a course in farm management so that some idea of the business side of agriculture may be gained. This is followed by a course in the broader questions of rural economics in political economy, for the profession of farming must be considered from local, state and national standpoints.

Space will not permit of a discussion of the subjects of chemistry, botany, physics, bacteriology and mathematics in their relation to plant life, the feeding of animals, the composition of the soil, the liberation of plant food in the soil, and the many phenomena connected with farm life and work; nor to mention the possibilities that lie before the people of the province along the lines of horticulture and especially when so many fruits are growing wild. However, all these subjects are given due prominence, as they all have their place and bearing in the work of the farm and in making an all-round trained agriculturist.

In order to complete this all-round training an effort is made to train students to express their knowledge and thoughts by intelligent and in intelligible English, written and spoken. Farmers have a right to representation by men of their own profession even in the legislatures, yet how few of them can express their views properly—even in a local school house? The college is giving the boys practice in speaking upon agricultural topics, so that they may know how to prepare their material for speaking and tell what they know. Since they will also be expected to write for publication they are being given a course in what may be termed agricultural journalism.

If a student feels he cannot take the full three years at the College

of Agriculture he may take a one-year course specially arranged for such a class of student. In time special courses will be arranged along various lines as the aim is to make the college of the utmost practical service to the community. Even if the student can spend only one year it will be worth while, for it will bring him in touch with a wider life and give him a broader outlook upon the world generally.

While some doubt has been expressed of the advisability of having the College of Agriculture in the university, the practical working out of the scheme so far has been satisfactory in every way. No student in agriculture has been tempted to enter other courses of study; on the contrary, the tendency has been the other way. In mingling with the students of other courses in sport, in social affairs and in the many activities of the general university life the students in agriculture have more than held their own. In rubbing shoulders with others of different

ways of thinking the rough corners have been rubbed down, a sane viewpoint attained and altogether the student obtains a broader outlook upon life and its many complex problems. What is of vastly greater importance is that he sees, as he has never seen before, the farm set in its true relation to the educational, social and economic conditions of the country and is inspired to return to the land to make good in his profession.

The best any institution can do is to give its students a start and a desire to excell. It is, therefore, the earnest wish of those connected with the College of Agriculture at the Provincial University to give its students that start or impetus which will enable them to develop into strong men, good men, and men who can take their places in the work of making agriculture a paying as well as an agreeable profession, and to win for it a proper recognition as to its being the paramount profession of this or any other province or state.

PROFESSOR OF FIELD HUSBANDRY APPOINTED

MR. G. H. Cutler, B.S.A., Professor of Cereal Husbandry at the University of Saskatchewan, has accepted a corresponding position in the De-

partment of Field Husbandry at the University of Alberta. Professor Cutler will begin his new duties on July 1st.

BRITISH COLUMBIA

THE DAIRIES REGULATION ACT

BY T. A. F. WIANCKO, PROVINCIAL DAIRY INSTRUCTOR

THE Dairies Regulation Act, Chapter 16, 1916, the rules and regulations of which have just been passed by Order-in-Council and which will go into effect shortly, provides that every creamery, dairy, shipping station, milk factory, cheese-factory, ice cream manufactory, milk-condensory, market, milk plant, and any person receiving, buying, accepting, and dealing in or paying for milk or cream on the basis of the butterfat contained therein, shall be required to hold a licence which shall be issued on application to the Department of Agriculture of British Columbia upon payment of an annual fee of \$1. The licence may be revoked by the Department, if the licensee fails to comply with the provisions of the Act.

The Act also provides that every creamery or dairy so licensed shall have in its employ one or more licensed testers who shall supervise and be responsible for the taking of all samples and shall operate the Babcock test of milk and cream.

The licence shall be issued to such person by the Department of Agriculture upon presentation by the applicant of proof of his competency and payment of a fee of one dollar. The licence shall be valid for a term of one year and may be renewed upon application without examination, but may at any time be revoked if the licensee fails to comply with the rule and regulations under which the licence was granted.

A candidate for a tester's licence must take and successfully pass a tester's licence examination. The announcements of such examination

will be issued by the Department of Agriculture, due notice being given of place and date of such examinations. The written examination will consist of a series of questions on the composition and testing of milk, cream, butter, cheese, ice cream and all by-products of the dairy.

The laboratory test will cover a period of several hours in which the candidate will be required to test samples of milk, cream, etc.

The rules and regulations provide that the milk and cream of each patron shall be accurately and correctly weighed, and for testing purposes a sample representative of the contents of all cans in each consignment of each patron must be taken. Samples must be kept in a cool place, in separate, well-stoppered bottles and tested not less often than semi-monthly and reports mailed or handed to the shipper immediately following the making of the test. Samples shall be held for verification for seven days after the test is made, except that in cases of dispute they shall be held until a Dairy Inspector of the Department of Agriculture shall have tested them.

The Act provides further that it shall be unlawful to fraudulently manipulate the weights of milk or cream of any patron or to take unfair samples or to fraudulently manipulate such samples. It shall be unlawful to under-read, over-read, or otherwise fraudulently manipulate the Babcock test or to falsify the record thereof.

Penalties of from \$20 to \$100 for any violations of the provisions of the Act are provided.

PART III

Rural Science

THE SCHOOL INSPECTOR AND RURAL SCIENCE

NOVA SCOTIA

BY E. ROBINSON, INSPECTOR, DIVISION NO. 5

UP to the present time, rural science has been taught in our schools by the regular teachers. The time may come when schools, teaching agriculture only, may be established at various centres, but it is safe to assume that our present system must continue for some years.

These rural science teachers are all normal-trained, and have taken a special course at a summer school dealing with this particular work. Since, in addition to teaching rural science, the regular work of the school must be carried on, it will be seen that these teachers are subject to a double inspection. The work done must satisfy, not only the director of rural science, but the regular inspector of schools.

Under such conditions the rural science teacher is unfortunately placed, unless there be close co-operation between the director and the inspector. In attempting to serve two masters, she may fail to please either.

The inspector should not feel that rural science is a new subject, grafted on a course of study already too elaborate. Nature study has always been on the course of study. Rural science is the logical outcome of nature study. Nature study was an attempt to bring portions of the world into the school-room. Rural science is an attempt to take the school-room out into the world. The former was fragmentary; the latter is comprehensive.

Let the inspectors attend the classes of the rural science teachers at their summer schools, and let the director attend the institutes of the teachers, when the regular work of the school is considered, and not only will these officials co-operate in their work, but a method of co-ordinating the rural science work with the regular work of the school will be evolved, which will result in added enthusiasm on the part of both teachers and pupils, in all branches of the school work.

ONTARIO

BY J. W. FORRESTER, PUBLIC SCHOOL INSPECTOR, DUNDAS COUNTY

ONE of the greatest problems that the Canadian people have to solve to-day, is "increased food-production". We are told that the food supply of the world is very low. This condition of affairs has been caused by increased non-production, and the loss in tran-

sit. Urgent appeals have been, and are being, sent out by every important political, educational and social organization throughout the Empire; and from Canada, the greatest agricultural unit of the British Empire, a reasonably large increase in food products is looked for.

The question naturally arises, what can the school inspectors do to help agricultural conditions throughout the province. The Ontario Education Department is doing everything in its power to relieve the shortage of farm help in this province. At the mid-summer examinations of 1916, hundreds of boys obtained their departmental certificates by leaving school in April or May and working for a period of at least three months on farms. This year the same option for Departmental examinations is being given to both boys and girls who can furnish satisfactory evidence that their services will be required on the farms.

Much of the responsibility regarding the boys and girls of the public and separate schools taking the farm option falls upon the Public School Inspector. He should neither over-encourage nor unduly discourage this work. It is a privilege that should not be abused. This year thousands of farmers in Ontario will be able to cultivate a larger acreage, and handle more cows and swine, because of the help received from the boys and girls of the schools.

I think it is a reasonable statement to make, that, apart from the District Representative of the Department of Agriculture, there is no man who better understands the economic and, I trust, the agricultural conditions, of a county, than the Public School Inspector. This should have an important bearing on the relation of agriculture to the schools. The Education Department encourages the teaching of agriculture in all the schools, and it is in connection with this work that the School Inspector has a great opportunity to co-operate with the District Representative in

his school fair work; and thus help to overcome the antagonism that the older type of farmer has to the teaching of agriculture. He will tell you that his child can learn sufficient agriculture at home, and that the work taught in the schools should consist principally of the "three R's". These objections can be overcome by getting the children interested in agriculture in school.

The treating of seed grain to prevent rust and smut; the sowing of the best types of grain for that particular locality; the planting of approved varieties of potatoes and beans; the raising, feeding and caring for poultry; the milk-testing of individual cows of the home herd; the value of clover crops for fodder and fertilizing material; the rotation of crops; the recognition and destruction of noxious weeds; the relation of birds to agriculture; the mode and value of spraying fruit-trees, shrubs and potatoes; the making and caring for lawns and hedges, and the beautifying of the home and its surroundings; are topics sufficiently interesting to place agriculture on a sure footing, in the face of the strongest opposition. Every teacher giving instruction in agriculture should teach, not only the topics mentioned above, but also many more that have a bearing on the economic and industrial life of the community.

The curriculum in agriculture is suggestive rather than obligatory, and affords ample opportunity to select work that may have a special value to any particular locality. It is here that the inspector can co-operate with the teacher to make sure that the agriculture taught has a direct relation to the work of the majority of the people in the district. Registered herds of cattle in the vicinity should be visited, and all the information possible obtained from the owners. This will form the basis of several interesting lessons in the school. Records of these observations and discussions should be kept by the pupils. Similar visits to cheese

factories, to orchards that are being sprayed; and to any other place in the neighbourhood, where work is being done, that will be of special interest to both pupils and parents. It is of first importance in this work, to relate what is taught in the schools with the home life of the pupils, and thus make it a part of their thinking and acting. The teaching of agriculture has failed, and will continue to fail, just so long as this important relation is overlooked by teachers and inspectors.

It is a commonplace statement, but none the less true, that until a child goes to school, he learns nothing that has not some direct bearing on his life. Activity based on liberty is the chief guiding principle of the so-called, newer schools. We are also told, on first-class authority that "a child is not born with faculties to be

unfolded, but with special impulses of action to be developed through their use in preserving and perfecting life, in the social and physical conditions under which it goes on." In other words, should agriculture be used to teach our boys and girls how to live, or how to earn a living?

Shall it be used for cultural or efficiency purposes? The answer, I think, is obvious. Apart altogether from the world-wide demand at the present time, for "increased food-production", is the problem of bringing about a better understanding between the average farmer and the rural school teacher regarding the teaching of agriculture.

In the solution of this problem lies the School Inspector's opportunity to aid the greatest of all industries—agriculture.

BY P. J. THOMPSON, INSPECTOR OF PUBLIC SCHOOLS, LONDON

A necessary requirement in the successful introduction of any reform or innovation is that the public concerned be informed regarding the benefits which will result from the measure, so that it may be sympathetically received and that prejudices against it be removed.

In the introduction of new subjects like rural science, manual training, etc., into the course of studies for schools, the School Inspector must do much of the preparatory work required to have them recognized as subjects of prime importance in any rural course of studies. He must confer with municipal councils and school boards, point out the true meaning of education and show that these subjects, which are full of interest to the pupil, are connected with his home life, and can also be correlated with so many of the other studies, lend themselves best to the development of the powers and faculties of the pupil such as memory, observation and thought, and

especially those of self-reliance, system, neatness, care of property and power of initiation. Besides informing the public, the inspector must render assistance to the teachers until they are better prepared to undertake this work, because many of them have been reared in city homes and have no special training and possess little information bearing on the subjects. Perhaps he may best do this by preparing a definite outline of work based on the Department's course in which are outlined studies of plants, animals and soils, experiments in physical science, and a few experiments to be conducted in the school garden, etc. The teacher can then make herself familiar with a definite course for that year instead of being bewildered by the general aspect of the course. If the inspector follows this up by giving information or assisting the teacher to secure this information either at the Teachers' Institutes, or by the formation of Saturday afternoon classes, and whenever he visits the schools, the

teachers will not be afraid to undertake the work.

He should also advise the teachers to prepare themselves to do the work more efficiently by taking advantage of the summer courses provided by

the Department. Suitable books for the school library should be suggested and boards of trustees encouraged to spend the grants available in purchasing equipment needed to do the experimental and practical part of the courses.

BY J. N. DENYES, INSPECTOR OF SCHOOLS, MILTON

AT present the chief sphere of usefulness of the Inspector of Schools, in this province, in my opinion, will be found in the effort he may make to educate his constituency towards seeing the advantage of consolidation of schools as affecting this problem. It will be only through such a system worked out to its logical conclusion that really worth-while results will be obtained. Manual training and household science are not likely to reach any adequate measure of value or efficiency in the average one-roomed rural school. Multiplication

of subjects is impossible under one-roomed conditions, and the larger and better-arranged school is demanded. The inspector will find his efforts best directed through county organization of rural trustees who, I am sure, will be led to understand the value of the larger purposes to be served by enlarging the school-community unit.

In the meantime the inspector should identify himself as closely as possible with the rural school fairs and encourage the introduction of the subject of agriculture in his larger rural schools.

SASKATCHEWAN

BY A. KENNEDY, M.A., INSPECTOR OF SCHOOLS, WEYBURN INSPECTORATE

THE historical development of rural science as an important element in education may be traced in cycles—approximately seven-year periods. The period 1902-1908 may be known as the nature-study period; the American nature study society was organized early in this period and established an official organ, *The Nature Study Review*, in 1905. This period marked an earnest effort to replace the formal, so-called scientific subjects, transplanted in the elementary schools from the universities and collegiate institutes, by a direct, living contact with nature. The field, however, proved so wide and inexhaustible that nature study was found very indefinite and difficult to organize and for this reason proved a source of much confusion to the public school teachers. *The Nature Study Review*, *The Cornell Rural*

School Leaflet and similar publications made heroic attempts to inspire, encourage and assist the teachers, but found the task difficult chiefly by reason of the influence exerted through examinations by the science masters and professors, interested in botany, zoology, etc.

The period of 1909-1915 may be known as the school-garden period; the school garden association of New York City was organized in 1909 and the school-garden association of America was organized in 1911. The chief propaganda of the school garden association of America was to lead the people to realize that their little children must be brought more directly into contact with mother earth in order to be educated. The rapid spread of this movement from ocean to ocean appears to indicate a more satisfactory understanding by the teachers of the foundation to be

laid in elementary education as well as a greater definiteness in the actual work to be done. The organization of school garden exhibitions gave an interesting and helpful focus to the movement and attracted the attention of parents and trustees to the possibilities of the work from an educational point of view.

The period of 1916-1922 will probably be known as the rural education association period. The natural outcome of the preceding period was the organization, for purposes of co-operation, of school exhibition associations, rural or municipal, education associations, or similar organizations, to foster, manage, and control school exhibitions and other educational activities locally. It is to be noted that the school garden exhibitions have given place to school exhibitions, indicating a broadening of the scope of the exhibitions, chiefly to include the results of household science, manual training and class work, and thus emphasizing the educational value of these activities. Boys' and girls' club work not only for the children attending school, but also for the youths on the farm and in the village who have not been attracted to the secondary schools, has also been an outgrowth and expansion of educational work, under the auspices of the rural education associations. The appointment in various provinces and states of directors of household science, school agriculture, etc., has given direction and impetus to the development of rural science during this period.

Throughout these three periods inspectors of schools have been able to give encouragement and direction to the movement toward a broader, richer education of the children in the elementary schools by contact with the teachers and children, not only in the class-room, but also at the various teachers' meetings, institutes and conventions; also by contact with parents and trustees individually and through various community organizations. The organi-

zation of provincial trustees' associations, as well as of local trustees' associations, has also afforded opportunity for directing attention and discussion to the development of rural science. The financing of these activities, particularly the school garden exhibitions and school exhibitions, has been a necessary problem to solve; the president of the school garden association of America, however, early pointed the way when he said: "If school gardens do not offer an integral element in education then they may as well be abandoned, but if they are fundamental in the development of efficient citizens then they command sympathetic and steady public support." School Boards have not failed to recognize the principle and have responded generously in appropriations to the financing of the movement.

In Saskatchewan very satisfactory progress has been made, particularly during 1915 and 1916. The Agricultural Instruction Committee, representative of the Departments of Education and Agriculture, and the College of Agriculture, with the three Directors of Household Science and School Agriculture, has given direction and encouragement, while the inspectors of schools have taken advantage of every opportunity to assist in the organization locally. Conditions in this young province have been, and are such, that the average period during which a teacher remains in charge of one school is very short, so that teachers' associations have little permanency. The rapid growth of the province, at least, in the organization of school districts, makes for a lack of permanency also in the inspectorial boundaries. In spite of these handicaps associations are formed in each inspectorate and often these associations directly or indirectly foster the organization of school exhibition committees, school exhibition associations, or rural education associations, depending upon local conditions. School Agriculture Circular

No. 7, recently issued, gives a report of some forty rural education associations and their activities. At least 84 school exhibitions were held during the fall of 1916; approximately 10,000 children took part, 40,000 entries were made, 19,000 people attended and 550 school districts were represented. The school garden association of Saskatchewan, organized April 25th, 1916, meeting with the Saskatchewan educational association, with a membership of 241, affords an opportunity for discussion and interchange of ideas.

During 1916 the Weyburn inspectorate was very fortunately situated in respect to the rural municipalities, with convenient municipal centres and railway facilities. (Each rural municipality is eighteen miles long and eighteen miles wide.) The following were included:—Cymri R.M. 36, Lomond R.M. 37, Brock R.M. 64, Tecumseh R.M. 65, Griffin R.M. 66, Weyburn R.M. 67, Fillmore R.M. 96 and Wellington R.M. 97. Each municipal council includes a reeve and six councillors. The following agricultural societies were in operation, the sphere of each being practically the rural municipality:—Midale in R.M. 36, Colgate in R.M. 37, Arcola in R.M. 64, Stoughton in R.M. 65, Weyburn in R.M. 67 and Creelman in R.M. 96, while steps were being taken to organize Griffin in R.M. 66 and Cedoux in R.M. 97. Reference is made to these because the rural education associations endeavoured to co-operate with both the municipal council and the directorates of the agricultural societies. In each municipality there were from 12 to 18 school districts, varying in size according to local conditions. In my efforts then to effect the organization of a rural education association in each rural municipality invitations were issued not only to the teachers and trustees but also to members of council, directors of the agricultural society and others interested in educational work. Similarly in the election of an

executive of seven, an effort was made to secure a representative body, including strong men and women from the various sections of the municipality and from the various corporate bodies. This executive then appointed a secretary-treasurer. The work undertaken included the holding of a school exhibition at the municipal centre during September, the operation of boys' and girls' club contests and the providing of means for study and discussion of the various phases of agricultural education.

The financing of each association found four sources of revenue:—1, membership was open to every man, woman and child at an annual fee of twenty-five cents; 2, an appeal was made to the boards of the school districts for appropriations on the basis of ten dollars per district, or classroom; in R. M. 66 of 15 districts, 11 responded to the appeal, while in R. M. 97 of 16 districts, 12 responded; 3, appropriations were made by certain municipal councils: R. M. 36, \$125; R. M. 66, \$125; R. M. 96, \$125; R. M. 97, \$50; 4, contributions by private individuals and firms in amounts up to \$100. In this connection mention should be made of the concession made by four chartered banks in the matter of loans to minors, without security, in order to assist in financing the members of the clubs. The chief items of expenditure were in connection with prizes for the school exhibitions and awards for the club contests. To the winners of the greatest number of events in the exhibitions were given gold, silver and bronze buttons stamped with a design including the coat of arms of the province, Weyburn Inspectorate, School Exhibition, 1916. The annual financial statement of R. E. A. of R. M. 36 showed revenue amounting to \$323.50 and expenditure amounting to \$244; that of the R. E. A. of R. M. 67 showed revenue amounting to \$237 and expenditure amounting to \$232.20. The success of these organizations is indicated by the manner in which re-organization

has been effected for 1917 and the financial support accorded by the bodies voting appropriations in 1916.

The Inspector of Schools contributes to the foundation of such a movement chiefly by executive assistance and direction, at least until organization and financial support are assured. He must keep in touch with progress in other provinces and states and adapt the work to be undertaken as well as the manner of its conduct to the peculiar needs and conditions of his inspectorate. He must bring to the attention of teachers, trustees and parents the sources of best information in respect to the various phases of rural science, particularly convincing them of the educational value of these activities and demonstrating how best they

should be financed. The actual operation must remain in the hands of the teachers and trustees so that the progress made may be a true indication of the best thought of the community. A progressive executive has arranged a programme sufficiently interesting and attractive to gather together at the municipal centre some three hundred men, women and children; if such meetings were arranged even three or four times each year, at convenient seasons, much good would be done the cause of education. The movement is truly democratic and has its focus in the best educational interests of the boys and girls attending the elementary schools. The period 1916-1922 is rich in promise; let us have the necessary patience and perseverance to assure the fulfilment of the promise.

BY W. S. CRAM, INSPECTOR OF SCHOOLS, SWIFT CURRENT

THE Swift Current inspectorate is situated in the treeless belt in the south-western portion of the province of Saskatchewan. In the year 1914 there was a crop failure and many of the farmers were under Government aid. This fact, along with the one already mentioned, namely, the natural absence of trees, means that the work of rural science from the standpoint of tree planting and of school gardening has developed somewhat slowly.

Two directors of agricultural education, one for the southern and one for the northern portion of the province, have, during the past two years, organized the work of rural science on a more efficient basis. As an inspector of schools, I have found it to be the first duty to endeavour to inculcate an interest in the beautifying of the school grounds. It takes two years to prepare the soil satisfactorily for trees, and in this section of the province they require more attention after being planted than in their natural habitat further north. Each year finds a response

from a larger number of school districts, especially from those in which there is a live teacher, imbued with the spirit of rural life. For example, the chairman of one rural school board—a Norwegian district—recently reported:—

“Two years ago our teacher taught only reading, writing and arithmetic; he took no broader interest in the children. Last year our teacher had a good school garden, and many forms of busy work within the school. The pupils took a delight in their garden and did all the better work in their classes.”

The problem is one of co-operation of teacher, school board and Department of Education. The teacher must not merely show an interest in rural life, but must have some knowledge of the requirements in order to gain the most satisfactory results, and, in order, also, to gain the confidence of the community in the accomplishment of these results. The short courses at the Agricultural College are deserving of every encouragement, and have tended to prepare the teachers more fully for this work.

During each year we hold a local

convention at Swift Current. The subject of school gardening has received special attention on the programme. This last year three of the teachers, who had met with best success, told the story of the summer's work—the selection of the seed, the preparation of the ground, the difficulties overcome, the advantages in correlation with the other subjects of the school curriculum. Dr. Hogg, Professor of Physics in the University of Saskatchewan, addressed the teachers on the subject of elementary science.

The school fair is new in this portion of the province, but at the local convention, in October, 1916, a school fair committee was appointed to co-operate with the teachers towards fostering a broader and deeper interest in this work. The following extracts from a circular letter sent to all teachers will suggest the viewpoint of the committee:—

"The school fair lends motive and direction to the work of the children. Several schools may unite, form a rural education association, and hold a joint meet for the children, at which they will compete in sports and in various lines of school activities, as suggested in the programme. We feel that such gatherings and friendly competitions will add a spirit and zest to the life of the school. The best of the exhibits at the local fairs should be sent to Swift Current for the occasion of the teachers' convention, the latter part of September.

"To compete fully in the fair, each school must have a garden. If your school

did not have a garden in 1916, prepare a plot of ground, and make a garden for the year of 1917. We want your co-operation in this work."

The eye of the child, as well as that of the adult, should be trained to see the beautiful in nature. The writer is inclined to think that on these broad prairies, with their extensive farms, and amidst the struggles of the pioneer in making a living, the æsthetic rather than the economic must form the foremost view point in the rural science of the little one-roomed school. To quote from Fletcher B. Dresslan of Peabody College for Teachers, Nashville, Tennessee:—

"Beauty is more than economical; it is educational in the highest sense. Beauty is not for the rich; neither is it for the poor. It is for all. A beautiful country school building, appropriately located, will exert a quiet but persistent educational influence on all who are associated with it, in school or out. Its unconscious reflex influence will enter into the life of the neighbourhood and, of necessity, express itself in many ways. All who see a beautiful and appropriate school building are inclined to be more loyal to the cause it represents and less satisfied with ugliness anywhere. The district schoolhouse is the only building in the community that belongs to all, and in a definite way it reflects the civic standards of all. It is, therefore, important to express through it the highest attainable ideals of beauty and fitness, so that it may serve all acceptably."

Let us as teachers and as school trustees work effectively, if quietly, towards this end.

BY W. T. HAWKINGS, SCHOOL INSPECTOR, MOOSE JAW

I have attempted at one local convention to get the hearty co-operation of the teachers and to assist them in the work. When visiting the various schools I also endeavour to awaken an interest in this work by public meetings held at various centres, and when visiting local school districts, I discuss the matter with the school trustees and the people resident in the district.

The executive of the teachers' convention of the Moose Jaw inspectorate are completing arrangements to

hold a school fair at Moose Jaw during the convention, on September 27th and 28th, 1917. Schools representing municipalities numbers 223, 193, 191, 131, 132, 133, 163, 162, 161, 160 are expected to take part in this fair and to send exhibits.

Prizes are being offered for competition in the following groups.:

I. ANIMAL RAISING:

- (a)—Children's Pets—Accompanied by record of feeding, care and growth.
- Pigs—Accompanied by record of feeding, care and growth.
- Chickens:

1. Laying strains—2 poulets.
2. Market animals.
- (b)—Collection of Eggs:
 1. $\frac{1}{2}$ doz. white.
 2. $\frac{1}{2}$ doz. brown.

II. SCHOOL AND HOME GARDENING:

- (a)—Vegetable Raising—Accompanied by record of soil preparation, growth, etc.
 1. peck potatoes.
 2. $\frac{1}{2}$ doz. beets.
 3. $\frac{1}{2}$ doz. carrots.
 4. 2 heads cabbage.
 5. $\frac{1}{2}$ doz. turnips.
 6. $\frac{1}{2}$ doz. onions.
 7. Exhibits with records from experimental plots: (a) wheat; (b) oats.
 8. Grading of wheat.
- (b)—Plant Raising—Accompanied by record of soil preparation, growth, etc.
 1. Flowers in pots from slips.
 2. Flowers from seeds.
 3. Flowers from bulbs.
- (c)—Record of work attempted on the farms—With extended notes on the knowledge gained and the results achieved.
- (d)—Fruits:
 1. Collection of fruit raised.

III. HOUSEHOLD SCIENCE:

- (a)—Baking:
 1. School lunch; bread; cakes; buns; fruit preserving, one pint jar.

- (b)—Sewing and Knitting:
 1. Exhibition of various stitches (junior pupils) Grades I, II, III.
 2. Some useful article made by pupils.
 3. Cushion or fancy work.
 4. Stockings made by pupils.
 5. Mittens made by pupils.
- (c)—Record of work attempted in the home—with more or less extended notes on the knowledge gained and the results achieved.

IV. MANUAL TRAINING:

- (a)—1. A round or flat ruler.
2. Bird's house.
3. Some useful article.

V. SCHOOL WORK:

- (a)—1. Exercise books.
2. Writing (Junior pupils) Grades I, II, III.
3. Composition, at least 40 lines.
4. Drawing—(a) Junior pupils, Grades I, II and III; (b) Senior pupils.
- (b)—1. Collection of wild flowers.
2. Collection of weed seeds.

VI. PROGRAMME TO BE GIVEN BY PUPILS:
Each school to be given 10 minutes.

ONTARIO

AGRICULTURAL INSTRUCTION IN PRIMARY AND SECONDARY SCHOOLS

IN that section of the Report of the Minister of Education for Ontario devoted to the work of agricultural instruction, Mr. J. B. Dandeno, Inspector of Elementary Agricultural Classes, states:

The influences created by the introduction of nature study, the different viewpoint brought about by the laboratory method in science, the changed attitude of the younger generation towards material progress, have all made the introduction of any new subjects, especially those dealing with material things, much more easy of accomplishment. But one of the most important factors, perhaps the chief factor, in bringing about the actual introduction

of agriculture into both Primary and Secondary schools was the appropriation of a portion of the Federal funds derived under THE AGRICULTURAL INSTRUCTION ACT to be used in promoting agricultural education.

This money which is administered by the Department of Education is used in various ways. But the chief object kept always in mind is, that the best results will be obtained by using the money to bring about directly the actual teaching of the subject in the schools. To accomplish this a part of the money is used in the training of the teacher, another part in payment for actual equipment to be used for instruction, another for the work of special inspection, and still another to boards and teachers for managing school gardens.

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

ACTS RELATING TO AGRICULTURE

LEGISLATION FOR WEED CONTROL

Besides the important Seed Control Act of the Dominion every provincial legislature, excepting only that of Nova Scotia and of New Brunswick, has a measure on its book of statutes known as The Noxious Weeds Act. The Acts differ in terms and operating methods, but all have the same objects in view, not only the suppression and destruction of noxious weeds, which it is estimated entail a loss to the country of a dollar an acre, but also the preservation of the purity of seed, which means immense gain both to the agricultural community and to the nation. Nova Scotia and New Brunswick rely upon the provisions of the Dominion Act and upon local action provided for in The Municipal Acts of the two provinces. In considering the various measures, it should be borne in mind that their close observation means great national profit in health and wealth by ensuring good food and improved trade. It is also of value to remember that the most prolific source of weed infestation lies in the sale and exchange of commercial seeds and foodstuffs.

In the following summary of the different measures, an attempt has been made to avoid repetition and, while giving the main provisions, to point out not so much where the Acts agree as to emphasize wherein they differ:

After providing for the making of regulations for enforcement, and that penalties not exceeding \$50 may be imposed upon any person offending against them, The Seed Control Act of the Dominion, passed in 1911, decides that any officer appointed under the Act shall have the power to enter upon any premises to inspect seeds that he thinks may be infected. The Act does not apply to seed to be sold for food, or that is sold direct to merchants to be cleaned or graded before sale, or to seed stored for the purpose of being recleaned. No person must sell, offer for sale, or have in his possession for sale, any seeds of cereals, flax, grasses, clovers or forage plants except timothy, alsike, red clover and alfalfa, unless they are free from any seeds of noxious weeds, unless every receptacle containing such seeds is marked in a plain and indelible manner with the full name and address of the seller and the name of the seed, and the name of the seeds of the noxious weeds present in the

seed sold or offered for sale. Sellers of seeds of timothy, red clover, alsike or alfalfa must see that the receptacles containing them are marked in plain and indelible manner with the name and address of the seller and the name of the seed, with a designation of the grade of seed, whether Extra No. 1, No. 1, No. 2, or No. 3. Such marks may be accompanied by any private mark or brand not inconsistent with them and not showing up more conspicuously.

Clause 8 defines the grades and conditions required for sale as follows:—

"No person shall sell, or offer, expose or have in his possession for sale any seeds of timothy, alsike, red clover or alfalfa, in or from any receptable, package, sack or bag, upon which is marked,—

(a) "Extra No. 1.—unless such seeds are pure as to kind, clean, sound, plump, of good colour, free from the seeds of any noxious weeds, and contain not more than thirty seeds of all kinds of weeds,

including other useless or harmful plants, per ounce of the seed so marked.

(b) "No. 1—unless such seeds are clean, sound, reasonably plump, of good colour, contain not more than five noxious weed seeds per ounce of timothy, red clover or alfalfa, or ten of them per ounce of alsike seed and not more than one hundred seeds of all kinds of weeds including other useless or harmful plants, per ounce of the seed so marked.

(c) "No. 2—unless such seeds are reasonably clean, sound, contain not more than twenty noxious weed seeds per ounce of timothy, red clover or alfalfa, or forty of them per ounce of alsike seed and not more than two hundred seeds of all kinds of weeds, including other useless or harmful plants, per ounce of the seed so marked.

(d) "No. 3—unless such seeds contain not more than eighty seeds of noxious weeds per ounce of timothy, red clover, or alfalfa, or one hundred and sixty of them per ounce of alsike seed and not more than four hundred seeds of all kinds of weeds, including other useless or harmful plants, per ounce of the seed so marked."

No seeds of timothy, alsike, red clover or alfalfa, or any mixture containing seeds thereof, can be sold or held for sale, containing more than the maximum number of harmful weed seeds permitted in grade No. 3.

Penalties for violations of the provisions of the Act are, for the first offence, not more than one dollar, and, for each subsequent offence, not more than \$5, for each receptacle, package, sack or bag from which seeds are sold or intended for sale. In default of immediate payment of fines with costs a term of imprisonment not exceeding one month can be imposed. If the accused proves that the package is exactly as received by him from a seed merchant domiciled in Canada, he will not be held responsible beyond the costs of prosecution. Every magistrate disposing of such a case must send a report within a month from the date of judgment to the Minister of Agriculture, when action may be taken against the wholesale firm within a twelve-month from the time the matter of complaint or information arose. Obstructors to enforcement of the Act are liable to a fine not exceeding \$500 and not less than \$25, and, in default of payment, to imprisonment for a term not exceeding six months. An employee violating the Act makes the principal responsible. A purchaser possesses the option of sending seed to the Dominion Seed Analyst for analysis if he thinks the law is being violated.

The regulations under The Seed Control Act made by order in council were given in *extenso* in Vol. 1 of THE AGRICULTURAL GAZETTE OF CANADA, page 503, and the later regulations respecting special grades

for seed grains in Vol. 2, pages 943-4, while the general purposes of the Act were outlined by the Chief Seed Inspector of the Dominion in Volume 1, pages 160-2.

THE MARITIME PROVINCES

Prince Edward Island passed a Noxious Weeds Act in 1909. It calls upon every owner or occupant of land to destroy all Ragwort, Yarrow, or Wild Tansey, Orange Hawkweed, Wild Mustard, Black-eyed Susan, Sow Thistle and such other weeds as the Lieutenant-Governor in Council may declare to be noxious. Overseers of roads are required to report any disregard of the Act on property facing the highways to the local Road Inspector, who is to serve notice upon the person responsible not later than July 10th in each year. If the notice is not acted upon, the Road Inspector must lay information before a Justice of the Peace of the county. If the owner cannot be located, the Road Inspector can have the weeds destroyed and take steps to secure the repayment within thirty days of any expense incurred. If settlement is not made, the matter must be reported to the Commissioner of Public Works, who issues an order for collection, under the Public Roads Act, 1907, the amount being duly assessed against the land. The fine for contravention of the Act is not less than one dollar, nor more than five dollars.

Nova Scotia and New Brunswick have no distinct and separate legislation respecting noxious weeds, excepting that the matter is placed in the hands of the corporations by the respective Municipal Acts, sections of which provide that councils may make laws for prevention of the growth and spread of thistles and other noxious weeds.

QUEBEC

Quebec deals with the subject in articles 7353 and 7354 of the Revised Statutes of 1909 which provide, as detailed in THE AGRICULTURAL GAZETTE, Vol. 1, page 471, that any person may, by special notice, require any owner, occupant or holder of any land or common, not under seed, to cut and destroy, between June 1st and November 1st, the daisies, thistles, wild endive, chicory, celandine, orange hawkweed (paint brush) and all other noxious weeds or plants considered as such growing on the said land or common. If this notice is ignored for eight days, the offender can be summarily convicted and sentenced to pay a fine of 40 cents for each day of his neglect. A person scattering seeds of weeds to the prejudice of another incurs a penalty of not less than one dollar, not more than eight. Any person may, after notice, compel his neighbours to pull up wild mustard and daisies, even in a sown field, as soon as it flowers. All that is required to make a notice valid is that it shall be intelligibly set forth, dated and attested before two witnesses, or, in the event of the person

desiring to give the notice being unable to write, signed by a notary. Noxious weeds, such as daisies, thistles, wild endive, chicory, celandine, orange hawk-weed (paint-brush), and plants considered as such, which grow upon municipal roads, must be cut down and destroyed between the twentieth day of June and the tenth day of July in each year, by persons who are bound to keep the roads upon which they are found in repair.

ONTARIO

The Ontario Noxious Weeds Act requires that the occupant or owner of any land shall cut down or destroy all the Canada thistles, ox-eye daisy, wild oats, rag-weed, and burdock growing thereon as often as is sufficient to prevent the ripening of their seed, providing such cutting or destruction does not injure the growing grain. The council of any township may, by by-law passed upon the petition of thirty ratepayers, suspend the operation of the Act upon any large tract or block of waste or unoccupied land. The operation of the Act can also be extended by by-law to any other description of weed, or to any diseased growing crops, noxious to husbandry or gardening. The council of any municipality may appoint an inspector to enforce the Act and, upon petition of fifty or more ratepayers, must make such an appointment, fixing at the same time the remuneration to be paid or fees to be received. A municipality may also be divided into sections and an inspector appointed for each.

The inspector is required to give notice in writing to the owner or occupant of the offending land, requiring him to cut down or destroy the weeds or diseased plants within ten days, at the expiration of which period the inspector can either cut or destroy the weeds or diseased plants himself, or institute a prosecution, which, if successful, will subject the offender to a penalty of not less than \$5, nor more than \$20. In the case of the property being owned by a railway company notice must be given to the station master. If the land is non-resident notice is not required before proceeding to cut and destroy the weeds. By an amendment passed in 1916 it is provided that in the case of "resident land" in a city the notice may be mailed, and if the residence of the owner or occupant is unknown it may be addressed to the general post office of the city. The inspector is to keep an account of the expenses incurred, which the owner or occupant of the land must pay. The latter has the right to appeal to the council within 30 days if he thinks the charges excessive. In the event of non-payment the council is to assume the liability and collect the same as other taxes are collected.

Overseers of highways, or other officers charged with the care of highways, are

required to see that all noxious weeds growing within their jurisdiction are destroyed, the work to be performed as statute labour or to be paid for by the municipality. In unorganized districts where road commissioners have been appointed they are to enforce the law, the penalty for non-compliance by the owner or occupant being \$5 for each lot or parcel, fines so collected to be devoted to improvement of the road. If the Road Commissioners have to have the work done the charge is \$2 per day, to be paid by the occupant or owner.

Contraveners of any provisions of the Act subject themselves to a fine of not less than \$5 for each offence, or not more than \$20. Persons offering any seed for sale containing weed-seed and any persons sowing wheat knowing it to be infected with smut, without using some remedy to destroy the germs, are to be similarly penalized. Inspectors or other officers neglectful of their duty are in each instance, subject to a fine of not less than \$10, nor more than \$20.

In addition to the foregoing an amendment to the provincial Adulteration Act provides that bran, shorts or middlings and chop feed must be free from vital seeds of any of the noxious weeds mentioned in The Seed Control Act of the Dominion.

MANITOBA

Since the Noxious Weeds Act of Manitoba appeared in the Revised Statutes of that province in 1913, and was summarized in THE AGRICULTURAL GAZETTE, Vol. 1, pages 476-8, many changes have been made. In 1914, '16 and '17 bills of amendment have been passed, but the measure adopted in 1916 repealed that of 1914. In the second clause of the act (section b) it is explained that the expression "noxious weeds" means and includes perennial sow thistle, Canada thistle, Russian thistle, and tumbling mustard, together constituting class I, and common wild mustard, hare's ear mustard, wild oats, French weed or stink weed, false flax, giant rag-weed, dwarf rag weed, blue burr, blue lettuce, prickly lettuce, berberies vulgaris (commonly known as berberry bush) and couch or quack grass, constituting class II. The council of any incorporated city, town or village may pass a by-law adding any weed or weeds other than those herein enumerated that it considers noxious.

REQUIREMENTS OF THE LAW

Every owner, or occupant, of land, or agent for the same, is called upon to cut down all noxious weeds of class I on such land and noxious weeds of both classes on roads and highways adjoining to the extent of one-half the width in each year between May 1st and November 15th as often as may be necessary to prevent ripening and

scattering of the seeds. In case of waste land or Crown land the council is to carry out the law. Railway companies are required to clear the land they occupy on pain of a penalty of \$2 a day for each neglected section. If the companies fail to obey the Act the mayor or reeve can cause the work to be done and the municipality can recover the charges. Owners, occupants or agents failing to obey the law here set down is liable to a fine of \$15 for the first offence and not less than \$50 or more than \$100 for the second offence. Operators of threshing machines must clean the outfit, together with the wagons, so that seeds of noxious weeds shall not be carried from place to place, or suffer a fine of not less than \$25 or more than \$100 and, in default of payment, be subject to one month's imprisonment. A printed copy of the section of the Act containing this provision must be affixed to the machine under a penalty of \$10 for every failure. No lien can be recovered unless this section of the Act is complied with.

APPOINTMENT OF INSPECTORS

It is the duty of every municipal council to appoint before the 1st of March each year one or more officers who shall be known as municipal noxious seeds inspectors, and who shall devote their whole time between May 15th and October 15th, in seeing that the provisions of the Act are observed and carried out. If any council fails to make such appointment the Minister of Agriculture is called upon to do so. If any member of a council obstructs the appointment of inspector or inspectors he is to be disqualified for a year from election as mayor, reeve, controller, alderman or councillor of any municipality.

Notices requiring weeds to be cut down must be complied with within the period set by the notices, which must not be more than 5 days, or the offender becomes liable to a fine of \$25 for each day of neglect in addition to any other penalty incurred. In such cases the inspector must see to the cutting down of the weeds.

THE WEEDS COMMISSION

The Minister of Agriculture is authorized by the amending Act of 1916 to appoint one or more persons as Provincial Weeds Commissioners, whose duty it is to see that the inspectors do their duty. (A commission of three was appointed, consisting of Professor S. A. Bedford, chairman, and Messrs. George Walton and H. Brown.)

When an inspector thinks it necessary to cut down a growing crop on an area greater than three acres in any one quarter section, he must consult the reeve or one of the councillors, and, if they are not of one mind, the matter at issue must be laid before a provincial weed commissioner, whose decision is final. If the growing crop affected is less than three acres the

inspector can proceed on his own volition. Any person renting to any other person, land that has been condemned as harbouring noxious weeds, or seeds thereof, becomes subject to a fine of one hundred dollars and an action for damages unless the rentor is duly served with the notice, in which case he becomes liable. Inspectors must make out their reports in duplicate, one copy to be filed with the clerk of the municipality and one with the seed commissioners before November 15th in each year. An inspector failing to make such reports is liable to a fine of not less than \$25, nor more than \$50, in each case.

TRAFFIC IN INFECTED SEEDS

Offers to sell infected grain, grass or other seed, or sales thereof, bring liability to a fine of not less than \$10 nor more than \$100 and the justice of the peace may order that such seed be rendered useless for seed purposes. If bran or other feed products containing seeds of noxious weeds to an undue extent, either whole or crushed, are offered for sale, a liability of not less than \$25 nor more than \$100 is incurred. Railway companies, express companies, common carriers or any person, firm or corporation shipping out of the province cleanings or other refuse containing seeds of noxious weeds to an undue extent from any elevator or mill is liable to a like penalty. So, too, is any person, firm or corporation causing seeds of noxious weeds, whether mixed with other things or not, to be placed on any railroad, highway, street or land.

Any official failing to do his duty under the Act is liable to a fine of \$25 and not more than \$100. Any member of a council voting to remit any fine or costs imposed on an inspector for dereliction of duty is liable to a fine of not less than \$50 nor more than \$100 and to disqualification for the year. Default in payment of penalties under the Act may entail imprisonment for not less than a day nor more than a year. No conviction can be squelched or vacated for any cause that does not substantially affect the justice of the case.

Additions to the Act made in 1916 provide that any member of the Provincial Weeds Commission may levy a tax not in excess of fifty cents for each acre upon any lands found infected with weeds of Class I. The owner or occupant must be notified in writing and at the same time must be told what steps to take to eradicate the weeds. If he follows instructions the tax may be removed.

SASKATCHEWAN

Saskatchewan includes all the weeds in The Noxious Weeds Act of 1912-13, and consolidated 1916, specified in the Manitoba Act, excepting berberry hush and couch or quack grass and adds purple

cockle, cow cockle, birdrape, night flowering catchfly, tansy mustard, wormseed mustard and shepherd's purse. The Minister of Agriculture is authorized to appoint inspectors and every municipal council is required to appoint a similar officer each year before March 1st. Councils failing to make such an appointment are liable to a fine of \$25. Owners or occupants are required to take every reasonable means to control weeds or become subject to prosecution by inspector, secretary of municipality, or other officer recognized by the Act, or a resident ratepayer, and liable to a penalty not exceeding \$100 and costs. Clause 6 of the Act reads:—

"Any inspector finding noxious weeds growing in any grain or other crop may notify the owner or occupant in writing:

(a) To fence the straw and remove the screenings from such crop in closely woven and securely tied sacks within five days after it is threshed and not to remove any of such straw or screenings from the farm upon which they were grown or permit them to be so removed; or,

(b) To burn both the straw and the screenings from such crop within five days after it is threshed;

"Provided that, with the consent of the councillor for the division, any inspector may, if noxious weeds are very numerous in any growing crop, notify the owner or occupant in writing to summerfallow the field on which such crop is growing during the season next following or to sow it with some suitable grass seed or clover or a mixture of any of such of these as are commonly used in the district;

"Provided further that any inspector may notify the owner or occupant in writing to pull and burn Canada thistle or perennial sow thistle in any growing crop, or with the consent of the councillor for the division, may notify such person to cut and burn or plough under such crop or any specified part thereof, within a stated time."

The duties of the inspectors are much the same as those of Manitoba except that after destroying weeds they are required to sow "a proper quantity of some suitable grass seed or clover or a mixture of any of such of these as are commonly used in the district." Owners or those having any interest in unoccupied land can appoint a resident of Saskatchewan as agent and must inform the secretary of the municipality of such appointment. Such information is passed on to the inspector, who has to notify the agent by registered letter of the existence of weeds, which must be destroyed within 15 days.

Relative to the assessment for work done under special order, it is provided that no sum in excess of \$200 shall be charged in any one year against any one quarter section of land. No person must sell or

dispose of for the purpose of seed any cereal grain in which there is more than one seed of any noxious weed or weeds per pound of such seed, any flax in which there is more than one such weed seed per ounce of such, or any clover or grass seed in which there are more than five noxious weed seeds per ounce. It is specially provided that this section of the Act shall not apply to seed to which the provisions of The Seed Control Act of Canada are applicable. No affected seed can be shipped or hauled. No bran, shorts, chopped or crushed grain or cleanings containing seeds or noxious weeds can be purchased or sold unless the germinating qualities of such seeds are first destroyed. But such matter can be removed, under Departmental regulations, from elevator or warehouse for the purpose of sheep feeding or such other purpose as will insure the complete destruction of such seeds. The law governing threshing machines is the same as in Manitoba.

The Lieutenant-Governor in Council is authorized to appoint a weeds commissioner, who is to have supervision over all the inspectors, afford information to the public, prepare and supervise bulletins, conduct investigations and answer inquiries respecting noxious weeds.

ALBERTA

In the Alberta Noxious Weeds Act, which, next to that of Prince Edward Island, is the longest unamended measure of the kind in the Dominion, the weeds specified are the majority of those mentioned in the Manitoba and Saskatchewan Acts, with the addition of ball mustard, red root, Russian pigweed and tumble-weed. In the first operative clause the Minister of Agriculture is authorized to appoint inspectors. Owners and occupants failing to destroy noxious weeds within ten days of notification become liable to a fine not exceeding \$50. Weeds on public roads must be destroyed by the local improvement district in which they are situated. White clover, timothy or western rye grass, or a mixture of all or either of these, must be grown on earthworks made by railway or irrigation companies and at their expense. Anyone obstructing inspectors in the exercise of their duty becomes liable to a fine of \$25. These officers have the right to notify owners to pull by hand or cut and burn or plough under any crop of infected grain or hay, or part thereof, and to burn the straw or screenings or both from any crop, or part thereof, within ten days after it is threshed, or, at the option of the owners, to fence the same around with a legal fence and the same to be retained in good repair until necessary to be removed for the purposes of sowing the crop or cultivating the land the next following season. The provisions regarding railway companies are the same as in the

other provincial Acts and the manager, superintendent or ditch rider of irrigation companies must be notified of offences under the Act. The inhibits against the sale of impure bran, shorts, crushed grain or cleanings are similar to those elsewhere. Affected matter may be removed in closely woven and securely tied sacks to be burned or fed to sheep within enclosures owned by the feeders, such enclosures being open to inspection and lists of parties to whom screenings are sold being furnished monthly to the provincial Minister of Agriculture. Or the farmer can take such screenings home in closely woven or carefully tied sacks. The care of threshers is ordered the same as in Manitoba and Saskatchewan. Threshers must clean the grain threshed by them, and when it is delivered to the owner it must contain not more than 100 seeds of noxious weeds, other than wild oats, in one thousand of grain, and all screenings containing seeds of noxious weeds must be destroyed within five days after threshing or be removed in closely woven and securely tied sacks.

BRITISH COLUMBIA

In the British Columbia Act the noxious weeds mentioned are: Canada thistle, perennial thistle, sow thistle, bull thistle, Russian thistle, ox-eye daisy, wild mustard or charlock, tumbling mustard, ball mustard, wild oats, stinkweed, ragweed, blue burr or stickweed, dodder and such other weeds as may be specified by order-in-council. As regards owners and occupants the law is practically the same as in the Prairie Provinces and Ontario and Quebec, but subsection 2 of clause 3 provides that the council of any municipality shall be deemed to be the owner of all lands within the boundaries of the municipality, in-

cluding streets, parks, and vacant lots and of that portion of any road adjoining the municipality which lies between the centre line thereof and the municipal boundary. By clause 4 in default of payment of a fine incurred the offender becomes liable to a term of imprisonment not exceeding six months. Municipal councils and railway companies are required to cut down or root out and burn or effectively destroy as often as may be necessary all noxious weeds before the plants have sufficiently matured to seed. Railway companies and irrigation companies neglecting to do this on notification incur a penalty of \$2 a day. After notice by duly appointed inspector, the law in all cases must be complied with within seven days. The inspector may act without notice in case of non-resident land. In the case of Crown lands, the Deputy Minister must be notified, if within the Victoria assessment district; if without that district, the nearest Government agent or other Government officer. Expenses incurred in carrying out the law are to be met out of the Consolidation Revenue Fund. The Lieutenant-Governor in Council is empowered to appoint inspectors. Any person dealing in grain, grass or other seed among which there is present seed of noxious weeds in a greater proportion than five to one thousand of the seed dealt in is liable on summary conviction to a fine of not less than \$10 nor more than \$100, and the seed can be confiscated or destroyed. Any person knowingly conveying any noxious weed from one farm to another in threshing-machine, farming mill or otherwise, is liable to a like penalty. Generally the other provisions of the Act and the penalties incurred are the same as in, and under, the Manitoba Act. Penalties not specially provided for are limited to \$50.

"The school-garden as an aid in the teaching of agriculture is as yet very imperfectly understood and greatly underestimated. Many teachers still think of it as a place where pupils learn to make gardens and grow plants. Parents and trustees frequently hold the same view, and may commend or condemn according as they estimate the value of these very limited services rendered in comparison with the expense involved. On the other hand, the number of teachers and others who recognize the value of the school-garden in its numerous educational aspects and relationships is rapidly increasing in this province. People are coming more and more to recognize it not only as a valuable institution by itself, whereby nature-study and agriculture may be taught directly and effectively, but also as a means whereby the teaching of other school subjects can be made more interesting and also of greater value to the child."—J. W. Gibson, *Director of Elementary Agricultural Education for British Columbia.*

THE HONOURARY ADVISORY COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH IN CANADA

ON June 6th, 1916, a committee of the Privy Council of Canada, consisting of the Right Honourable the Minister of Trade and Commerce (chairman); the Honourable the Ministers of the Interior, Agriculture, Mines, Inland Revenue, and Labour, was formed by the Privy Council to have charge of all measures to foster the scientific development of Canadian industries in order that, during and after the present war, they may be in a position to supply all Canadian needs and to extend Canadian trade abroad.

Under this committee of the Privy Council there was constituted, on the 29th of November, an Honourary Advisory Council for Scientific and Industrial Research, composed of the following eleven members representative of the scientific, technical and industrial interests of Canada:

Administrative Chairman—A. B. Macal-lum, M.D., Ph.D., Sc.D., LL.D., F.R.S., Ottawa.

Members:—

- F. D. Adams, Ph.D., Sc.D., LL.D., F.R.S., Dean, Faculty of Applied Science McGill University, Montreal.
- T. Bienvenu, Esq., Vice-President and General Manager, La Banque Provinciale du Canada, Montreal.
- R. Hobson, Esq., President Steel Com-pany of Canada, Hamilton, Ont.
- S. F. Kirkpatrick, M.Sc., Professor, Me-tallurgy, Queen's University, Kingston, Ont.
- J. C. McLennan, Ph.D., F.R.S., Pro-fessor of Physics and Director of the Physics Laboratory, University of To-ronto, Toronto.
- A. S. Mackenzie, Ph.D., D.C.L., President, Dalhousie University, Halifax, N.S.
- W. C. Murray, M.A., LL.D., President, University of Saskatchewan, Saskatoon, Saskatchewan.
- R. A. Ross, Esq., E.E. (Tor.), M. Can. Soc. C.E., Consulting Engineer, 80 St. Francois Xavier St., Montreal.

R. F. Ruttan, M.A., M.D., Sc.D., Pro-fessor of Chemistry and Director of the Chemical Laboratories, McGill Uni-versity, Montreal.

Arthur Surveyer, B.A.Sc., M. Can. Soc. C.E., Consulting Engineer, 274 Beaver Hall Hill, Montreal.

Secretary—J. B. Challies, C.E. (Tor.), M. Can. Soc. C.E., Superintendent, Do-minion Water Power Branch, Ottawa.

This Advisory Council, by direc-tion of the chairman of the Com-mittee of the Privy Council, has been charged with the following duties:—

(a) To ascertain and tabulate the various agencies in Canada which are now carrying on scientific and industrial research in the universities and colleges, in the various laboratories of the Government, in business organizations and industries, in scientific associations or by private or associated investigators.

(b) To note and schedule the lines of research or investigation that are being pursued by each such agency, their facili-ties and equipment therefor, the possi-bilities of extension and expansion, and particularly to ascertain the scientific man power available for research and the neces-sity of adding thereto.

(c) To co-ordinate these agencies so as to prevent over-lapping of effort, to induce co-operation and team work, and to bring up a community of interest, knowledge and mutual helpfulness between each other.

(d) To make themselves acquainted with the problems of a technical and scientific nature that are met with by our productive and industrial interests, and to bring them into contact with the proper research agencies for solving these problems, and thus link up the resources of science with the labour and capital employed in the production so as to bring about the best possible economic results.

(e) To make a scientific study of our common unused resources, and waste and by-products of our farms, forests, fisheries and industries, with a view to their utiliza-tion in new or subsidiary processes of manufacture and thus contributing to the wealth and employment of our people.

(f) To study the ways and means by which the present small number of competent and trained research men can be added to from the students and graduates of science in our universities and colleges, and to bring about in the common interest a more complete co-operation between the industrial and productive interests of the country and the teaching centres and forces of science and research.

(g) To inform and stimulate the public mind in regard to the importance and utility of applying the results of scientific industrial research to the processes of production by means of addresses to business and industrial bodies, by the publication of bulletins and monographs, and such other methods as may seem advisable.

The following general regulations govern the award for 1917 of the studentship and fellowships instituted by the Honourary Advisory Council for Scientific and Industrial Research of the Dominion of Canada:

A. REGULATIONS GOVERNING STUDENTSHIPS

1. These studentships are intended, not to facilitate attendance on ordinary collegiate studies, but to enable students, who have passed through a college curriculum and have given distinct evidence of capacity for original research, to continue the prosecution of science with the view to aiding its advance or its application to the industries of the country. These studentships are open to men and women.

2. The studentships are each of the value of \$600 for the first year and of \$750 for the second year. The continuation of the studentship for a second year is dependent on the work done in the first year being satisfactory to the Advisory Council.

3. Application for a studentship must be made by the candidate to the Advisory Council. He shall, with his application, submit a complete record of his academic career and recommendations from the president of his university or institution, the head of the department with which he was connected, and the professor or instructor under whom he worked. He shall state the institution at which he prefers to study and the general line of work to be followed. The application will be considered and decided upon by the Advisory Council or by a special committee appointed by the same.

4. The candidates must be British subjects, resident in Canada or graduates of Canadian universities, and must be be-

tween the ages of twenty and thirty-two years.

5. A candidate must (1) be a *bona fide* graduate of a university or college in which special attention is given to scientific study; or (2) have received an equivalent training in an institution possessing adequate facilities of a scientific character for providing such training.

6. The departments of science in which capacity for research will be accepted as qualifying for a studentship are: biology (economic), chemistry, engineering, geology, metallurgy, mineralogy and physics.

7. The candidate must indicate high promise of capacity for advancing science or its application by original research. Evidence of this capacity is strictly required, this being the main qualification for a studentship. The most suitable evidence is a satisfactory account of a research already performed.

8. Studentships may be held at any Canadian university or institution approved by the Advisory Council during the first year, but the research may, during the second year, be carried on in some scientific laboratory or works.

9. The principal work of the holder of a studentship must be a research in some branch of science, the extension of which is important to the national industries.

10. Students are required to devote themselves for a period of at least nine months of each year wholly to the objects of the studentships, and are forbidden to hold any position of emolument or to engage in teaching.

11. Students are required to furnish reports of their work at the end of each half year of the tenure of their studentships. At the expiration of each year of studentship the reports of the student are referred to an authority on the subject treated, who furnishes an opinion thereon to the Advisory Council.

12. The studentship stipend is payable in two equal instalments, on September 15th and February 1st.

B. REGULATIONS REGARDING RESEARCH FELLOWSHIPS

1. The research fellowships are of the value of \$1,000 for the first year, and of \$1,200 for the second year if the Advisory Council should decide to extend the fellowship over two years.

2. Fellowships are only awarded to those who, either through previous tenure of a studentship, or otherwise, have shown a high capacity for research on some problem the extension of which is of importance to the national industries of Canada.

3. Applications for fellowships should be made in a manner similar to those for studentships.

ASSOCIATIONS AND SOCIETIES

THE DUNDAS DISTRICT HOLSTEIN BREEDERS' CLUB

Thirty breeders of pure bred Holstein cattle in the county of Dundas, Ontario, met recently and organized a Dundas District Holstein Breeders' Club. A preliminary survey of the county revealed the fact that there were some sixty-five breeders of pure-bred Holstein cattle in the county. Arrangements have been made by this club to hold a Holstein Field Day in June. This will take the form of a picnic and Holstein Demonstration Day and will be held on the farm of one of the

larger breeders. A sales committee was also appointed to work on the idea of holding a consignment sale in the spring. The following officers were appointed: Honorary president, G. B. Allison, Montreal, Que.; president, W. A. McElroy, Chester-ville, Ont.; 1st vice-president, Edward Baker, Winchester, Ont.; 2nd vice-president, M. Cummings, Ormond, Ont.; secretary-treasurer, Parnahan Allison, Chesterville, Ont.

THE SCHOOL GARDEN ASSOCIATION OF SASKATCHEWAN

The first annual meeting of The School Garden Association of Saskatchewan was held in Regina, April 10th, 1917. Some fifty or more members were in attendance. The programme included reports by the president and the secretary-treasurer, followed by brief reports from Mr. Jas. E. Cowie, Neudorf; Mr. Paul F. Trout, Blaine Lake; Mr. B. W. Wallace, Yorkton, and Inspector J. A. McLeod, Estevan; also an address by Mr. F. W. Bates, Director of School Agriculture.

The election of officers resulted as follows: President, A. Kennedy, M.A., Inspector of Schools, Weyburn; vice-presidents, Mr. W. J. Stevenson, Indian Head, and Mr. Jas. E. Cowie, Neudorf; secretary-treasurer, Mr. Chas. J. MacKay, Principal Souris School, Weyburn; executive, Miss Jessie Maxwell, Kindersley, Miss Irene Ferguson, Neville, Mr. G. H.

Lewis, Prince Albert. The objects of this association are (1) To encourage a study of the problems of the school garden from the point of view of its educational value; (2) To establish the school garden as an integral element in education, from the point of view of character building and the development of efficient citizens; (3) To foster and maintain interest in the school garden from the point of view that "the influence, rather than the instruction, the interest and inspiration, rather than the facts, are to be desired;" (4) To undertake to afford every child an opportunity to have flowers, birds, animals, a place in which to play, a garden for work, something to love. Membership in the association is open to teachers, parents, trustees, and others interested in the objects of the association; the annual membership fee is twenty-five cents.

THE ALBERTA HORSE BREEDERS' ASSOCIATION

The Spring Horse Show held by the Alberta Horse Breeders' Association at Calgary, April 11th and 12th, 1917, was most successful. The entries numbered 680, against 429 the previous year. The gate receipts amounted to \$3,953, against \$1,862 last year. The quality of the animals was excellent, and special mention might be made of the aged Clydesdale stallion classes, in which there were 39 entries, the aged Clydesdale mare class in which there were 21 entries and the aged Percheron stallion class in which there were 17 entries. Approximately \$1,000 more was paid this year in prizes than last

year. A large number of sales were made during the show.

At the annual meeting of the association, brief addresses were delivered by the Honourable Duncan Marshall, Minister of Agriculture for Alberta and Dr. J. G. Rutherford, of the Natural Resources Department, Canadian Pacific Railway, Calgary. The election of officers for 1917 resulted as follows: President, David Thorburn; 1st vice-president, George Hoadley, M.P.P.; 2nd vice-president, D. P. McDonald; Secretary, E. L. Richardson, Calgary, Alta.

THE ALBERTA HEREFORD BREEDERS' ASSOCIATION

The Hereford breeders of Alberta have organized themselves into an association with the object in view of encouraging the breeding of high-class Herefords and to advertise the breed. The officers elected

were: President, Simon Downie, Carstairs; vice-president, S. M. Mace, Pekisko; secretary-treasurer, Thos. Bellew, Calgary.

THE ALBERTA CATTLE BREEDERS' ASSOCIATION

The seventeenth annual auction sale of the Alberta Cattle Breeders' Association, held at Calgary on April 11th and 12th, 1917, consisting of pure-bred beef bulls, was most successful, the average being well above that of former years, as the following table indicates:—

BREED	1916		1917	
	Number Sold	Average Price	Number Sold	Average Price
Shorthorns.	187	\$221 06	268	\$248 18
Herefords	82	310. 06	157	366 37
Angus	34	175 73	38	303 48
Galloways	1	105 00	6	184 15
Red Polled.	..	.	1	245 00
Grand average price		\$202 95		\$269 49

The average prices at the previous sales for 5 years were 1915, \$158.79; 1914, \$186.65; 1913, \$202.61; 1912, \$113.11; 1911, \$98.39.

This year the highest price paid for a Shorthorn was \$1,350, for a Hereford \$1,500 and for an Angus \$610.

The sale entry list included 500 bulls contributed by 149 breeders, but only 470 were shipped in from 59 stations. There were 324 different buyers from 113 stations in Alberta, 10 stations in Saskatchewan and 3 stations in British Columbia. The association has now sold 4,244 animals for \$650,698.

The annual meeting of the Alberta Provincial Cattle Breeders' Association was held at Edmonton during the month of April. The election of officers for the ensuing year resulted in the following chosen: Honourary president, W. F. Stevens, Live Stock Commissioner; president, Angus McDonnell of Ray; vice-president, G. H. Cresswell, Edmonton; directors, W. H. Wallace, Viking; J. G. Clark of Clark Manor; Wm. Robinson, Vermilion; F. C. Smith, Lamont and J. H. Elliot of Irma; secretary-treasurer, W. J. Stark, Edmonton.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DAIRY AND COLD STORAGE BRANCH

The Rate of Precooling Fruit in Different Styles of Packages and at Different Temperatures, by Irwin Smith, B.S.A., and J. M. Creelman, B.S.A.; Bulletin No. 51, Dairy and Cold Storage Series. In the 16 pages of which this bulletin is comprised results and records are given of tests and experiments made and undertaken at the Grimsby, Ont., Precooling and Experimental Fruit Warehouse. By the means of copious charts the lengths of time are shown that are required to cool strawberries, cherries, raspberries, plums, peaches, pears, and apples in different styles of crates, boxes, baskets and, in the case of apples, barrels. On the back page of the bulletin the conclusions reached are summarized. Under certain conditions tender fruits can be pre-cooled in a short time, but with strawberries, tomatoes, cucumbers and cantaloupes extremely low temperature must be cautiously used. Other valuable suggestions will be found in the bulletin.

THE ENTOMOLOGICAL BRANCH

Common Garden Insects and Their Control, by Arthur Gibson, Chief Assistant

Entomologist, Circular No. 9. At a time when everybody is being urged to make use of every available foot of land, whether it be in back yard or vacant lot, or generally arable, a more timely publication than the Entomological Branch have here caused to be put out could hardly be devised. The Dominion Entomologist in his introductory letter says: "This circular has been written specially for the use of the owners of small gardens and the cultivators of vacant lots who, in their endeavours to respond to the call for increased food production by maintaining gardens and raising their own vegetables and other garden produce, are certain to encounter difficulties resulting from the inevitable attacks of insect pests which are liable to cause an appreciable or even serious reduction in the amount of the crop produced unless remedial measures are undertaken." The circular describes the nature and character of the insects, both predacious and parasitic, and describes how they can be identified and controlled, how insecticides should be made and applied, the methods of operation of the pests, whether the gardens be devoted to vegetables or flowers, and the plants which they differently affect.

Report of the Dominion Entomologist. Dr. Gordon Hewitt's report of the work of the Entomological Branch for the year

ending March 31st, 1916, is of the usual high order in arrangement and contents. In his introductory letter, after stating that a brief account is given of investigations continued or undertaken during the year, he outlines the character of the work that was carried on, including inspection and fumigation of imported nursery stock and other plant products and field work against the brown-tail moth in connection with administration of the Destructive Insect and Pest Act; the introduction and colonization of parasitic insects, and the study of natural control, and investigations relative to insects affecting cereal and field crops, fruit crops, food and shade trees, grain and other stored products, and domestic and other animals, household and public health. Progress is reported in the arrangement of the orders of insects in the National Collection, which is ever increasing in size and importance. Instructive reports are given of the field laboratories at Annapolis Royal, N.S., Fredericton, N.B., Hemmingford, Que., Vineland, Ont., Strathroy, Ont., Treesbank, Man., Lethbridge, Alta., and Agassiz, B.C.

THE LIVE STOCK BRANCH

Review of Co-operative Wool Sales in Canada; Preparing Wool for Market; Pamphlet No. 14, by T. Reg. Arkell and J. K. King. This pamphlet of 24 pages is of especial interest at a time when a great deal of attention is being given to improvement and development of the wool industry. A sketch is given of the movement and the causes that led up to it. The authors explain the reason that sheep-raising in Canada has been unremunerative in the past and the methods that have been applied, and are being applied, to betterment of the situation. The rapid increase in price that has taken place in the last three years is reviewed and proof produced that this has been brought about at comparatively little cost. The methods pursued are described and illustrated and the character of the wool that comes from each section of the country set forth. Explanation is given of the classification that is followed, of evils that should be avoided, and of the terms that are used and their significance. Directions for preparing and packing wool are set forth in clear and precise language. Description is given of a fleece folding box for use in tying fleeces. The last half of the pamphlet is devoted to very full and complete statements of the wool graded within each province and offered for co-operative sale, followed by diagrams indicating the percent of domestic grades for the Maritime Provinces and for the remainder separately and the range grades for Alberta. A note advises sheep raisers who wish to avail themselves of the assistance offered by the Department of Agriculture of the Do-

minion to apply to the Live Stock Branch for Pamphlet No. 7, giving details of the assistance and regarding the organization of a wool growers' association.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

PRINCE EDWARD ISLAND

Annual Report of the Public Schools. A noteworthy feature of this report, which is for 1916, is the testimony afforded relative to the progress being made in elementary agricultural education. The acting Chief Secretary of Education remarks: "The great impetus to the study of agriculture and to nature study in the schools by the agricultural grants has been much increased by the training given at the summer school and in Prince of Wales College. . . . Perhaps the most important development in this line of work during the past year has been the institution of the school fair. Five of these, in which more than 20 schools participated, were held last fall and the interest and enthusiasm they aroused in school work augurs well for the continuous and usefulness of this subject on our course. As a means of interesting parents in the school work of their children it excels all other methods and is doing much to break up that mutual shyness existing between parents and teachers."

The Prince Edward Island Department of Education, during the month of March issued Numbers 5 and 6 of *The School Circular* which is issued periodically in the interest of education in general but especially to promote rural science and other features of education meeting the needs of country life. *Circular No. 5* is devoted to the subject of school fairs, outlining the history of this movement, the plan of organization and the prize lists to be used at school fairs in the province during the present year.

Circular No. 6 contains suggestions for Rural Science Patriotic work for 1917; Honourable Martin Burrell's note to Canadians; the Ontario Department of Education's letter to Inspectors and Teachers, and notes relative to the sale of flower and vegetable seeds and grain, potatoes and eggs to schools.

NOVA SCOTIA

Proceedings of the Entomological Society of Nova Scotia for 1916. This is the second annual report issued by this society and contains in full, the proceedings of the second annual meeting held at Truro on August 4th, 1916, and the full text of addresses then delivered.

The Green Apple Bug in Nova Scotia, by W. H. Brittain, B.S.A., Provincial Entomologist, constitutes bulletin No. 8 of the Department of Agriculture. This bulletin is the result of an investigation of the life history, habits, injury and methods of control of this insect extended over two seasons.

During these two years the chief points in the life history have been worked out, its habits carefully studied and practical control measures devised. This and much other valuable information is contained in this bulletin, the value of which is greatly enhanced by many illustrations and particularly so by a coloured illustration showing the different stages in the life history of the insect and the injury wrought upon the apple.

The Apple Maggot in Nova Scotia, written by W. H. Brittain, B.S.A., Provincial Entomologist and C. A. Good, B.S.A., Assistant Entomologist, is Bulletin No. 9 of the Department of Agriculture. This bulletin, as stated in the introduction, is based upon a careful inspection of the territory throughout the province infested by the apple maggot, carried on for the past three years and upon the experimental work performed by Mr. Good during the seasons of 1914 and 1915. The purpose of the investigation was to determine the seriousness of the pest and to advise suitable control measures. The plan of investigation is outlined in this bulletin and the history of the apple maggot with a description of the injury done to fruit and the methods of control are described and suitably illustrated.

Report of the Superintendent of Education. In his report contained in this 208 page book, Principal Cumming, of the College of Agriculture, notes the decrease of attendance in the regular course for the 1915-16 term to 54 from 114 before the war. He also notes the fact that the rural science school, which is conducted jointly by the staffs of the Normal and Agricultural colleges during the months of July and August each year, was as usual very largely attended in 1916. Another feature is that the short course of two weeks, held in January, attracted this year 250 men and 41 women against 205 men and 60 women in 1916. There were also 200 men and women who attended intermittently. L. A. De Wolfe, Director of Rural Science, gives an encouraging account of the progress of his work. He reports the holding of 34 rural science exhibitions during the year, representing 153 schools. The banner exhibition was at Bridgewater, where a room 60 x 80 ft. was filled. Mr. De Wolfe says: "The home gardens are more successful than the school gardens. In fact the school garden in now interpreted in many counties to mean a garden under school supervision. The school garden at home, therefore,

seems to be the happy solution of most difficulties". Mr. De Wolfe further chronicles an increased attendance at the summer school. He suggests that the District Representative plan should be applied to the public schools, that is that a travelling rural science teacher should be appointed for each county or district.

QUEBEC

Premières semailles, by Georges Bouchard, Agronomist. The advantages of farming as a profession, the necessity of education for the farmer and the value of modern methods are told in an impressive manner in this interesting little book, which consists of a number of talks on agricultural matters. The titles of some of the chapters are suggestive: "Better be on the land than in a workshop," "Work in the field, Victory at the front," "The soil never dies."

In the introduction, Rev. Fr. Camille Roy expresses the hope that this book, "from which good seed drops as from the hand of the sower," may find a place in every farmer's library.

A series of short pamphlets on live stock judging has been published by the Quebec Department of Agriculture. These pamphlets, which state in a concise form the main point and qualities to look for in our farm animals, have been prepared by Mr. Joseph Pasquet, professor of agriculture at the school of agriculture of Ste-Anne de la Pocatière. They have the following titles: "*Ce que doit être le cheval*," "*Ce que doit être le porc à bacon*," "*Ce que doit être le mouton*" and "*Ce que doit être la machine animal*."

"*Etude sommaire sur les céréales—Notions botaniques*." An eight page pamphlet, describing the processes of growth of cereals and their characteristics, published as bulletin No. 25 by the Quebec Department of agriculture, by Mr. F. N. Savoie, B.S.A., professor of cereals at the school of agriculture of Ste-Anne de la Pocatière.

ONTARIO

Appendix to Annual Report of The Agricultural Societies of the Province of Ontario, 1916. This appendix contains the complete scores of the fields in the standing crop competitions conducted during 1916 together with the names of the successful competitors in sheaves and grain in the Canadian National and Central Canada exhibitions, and similar prize-winners at the Provincial winter fairs at Guelph and Ottawa held during the past winter.

Report of the Women's Institutes of the Province of Ontario, 1917, Part II. This volume contains the announcement of the summer series of Women's Institute meetings, together with list of speakers and their subjects with advice to district officers relative to making arrangements for holding the institute meetings.

School Gardens—Potato Planting in Sod—are the subjects discussed in Agriculture Circular No. 2, issued by the Ontario Department of Education to teachers of agriculture in Public and Separate Schools. Under the subject of School Gardens, plans are illustrated and described, while under the subject of Potato Planting in Sod, directions are given for the cultivation of land in sod and the planting of potatoes in such ground.

Crop Bulletin 130 starts with a table showing the temperature and precipitation as recorded at the Meteorological Office, Toronto, for the last two months of 1916, and the first three months of 1917. The rainfall was 1.77 inches below normal but the snowfall was 6.4 inches above. Information follows on the manner crops, orchards and small fruits have wintered and the situation and prospects as regards live stock, with comments on the necessity for increased production and the scarcity of farm labour. Summarized reports are furnished of the conditions in a multitude of districts distributed throughout the province.

Minister of Education's Report, 1916. Pages 67 to 102 of this report are devoted to the annual report of the Inspector of Elementary Agricultural Classes. Professor Dandeno goes fully into his subject, detailing with minuteness the progress that is being made, the requirements of teachers, the courses of study, the increases in school gardens and home gardens, the expenditure and the expense to students, efforts at beautifying school grounds, summer courses, home projects for lower schools, middle school examination papers, manual training and household science methods, etc.

Twelfth Annual Report of The Ontario Vegetable Growers' Association, 1916. This report of 78 pages contains in full the addresses delivered at the annual convention of the Ontario Vegetable Growers Association, held in Toronto, November 24th, 1916. In addition to including the report of the Secretary-Treasurer and the Vegetable Specialist of the Ontario Department of Agriculture, addresses on the following subjects are printed in full: Home Grown Vegetable Seed, Field Cultivation of Early Potatoes, The Present Status of Vegetable Nomenclature, Celery, Irrigation, Greenhouse Tomato Growing, Growing Onions for Profit, and Successful Growing of Cabbage.

Horticultural Societies Report, 1916. "Never before," says Superintendent J. Lockie Wilson in forwarding this report, "in the history of Ontario has there been such an awakening and earnest endeavour to brighten the home surroundings of the dwellers in cities, towns and hamlets. An outstanding feature is the desire on every hand to further the efforts of all who are

interested in increased production, and the utilization of the hundreds of thousands of vacant lots in every urban centre of Ontario." Exceptionally interesting addresses were delivered at the annual convention held in Toronto, November 22nd and 23rd, 1916, all of which are here given in full. Among them might be mentioned "Birds and Their Relation to Agriculture," by W. E. Saunders; "Diseases of Roses," by Dr. L. M. Massey; "Partners with God," by Dr. J. L. Hughes; "The Boy Scouts and Horticulture," by J. G. Gibson; "Vines and Their Uses," by W. T. Macoun; "Protection of Birds," by J. J. Kelso. A list of members in 84 societies in the provinces, 7 of which were founded in 1916, shows an increase from 14,565 to 15,992. St. Thomas comes first in largest membership with 1,188, Ottawa coming second with 901, and Toronto third with 900. A list of presidents and secretaries is given.

MANITOBA

The Manitoba Department of Agriculture has issued two large posters, one dealing with the Potato Scabs and outlining treatment for same, the other dealing with Smut of Grain and outlining and describing the formalin treatment of grain for this disease.

How to Use Formalin or Formaldehyde for Smut is the title of a leaflet prepared by Professor V. W. Jackson, of Manitoba Agricultural College, that has been circulated throughout the province. It explains the nature of formalin, the manner of using and the advantages it possesses over blue-stone in being cheaper and less liable to damage the seed.

Report of the Department of Agriculture and Immigration of Manitoba for the fiscal year ending November 30, 1916. This report just issued is much enlarged over former years, containing 204 pages and is splendidly illustrated throughout. Several entirely new features are introduced this year. Among these are reports upon co-operative wool marketing, the "Manitoba Cow Scheme", the work of the Stallion Enrolment Board, and Manitoba Bee-keeping. The reports of the Weeds Commission and of the Immigration and Colonization Branch are very greatly expanded over last year and discuss many interesting and entirely new phases of these important subjects.

Marketing Manitoba's Wool Crop—Season of 1917, is Circular No. 33—Revised—of the Manitoba Department of Agriculture. This circular of ten pages, many of them suitably illustrated, is at once an announcement for 1917 of the operation of the Departmental co-operative plan for handling wool, and a report of the operations of 1916. In that year, the Department handled 154,000 lb. of wool at an approximate bulk price of 32 cents per lb. as com-

pared with 69,000 lb in 1915, the price then being 26 4-5 cents. As there are now over 1000 flocks of sheep in Manitoba, a large increase in the amount of wool handled is expected. Complete directions for the care of sheep and wool, so that a good quality of wool may be marketed, are included.

Boys' and Girls' Clubs—Manitoba. Under this title there has been assembled and printed under one cover the following bulletins: "Boys' and Girls' Clubs" by S. T. Newton, Superintendent, Extension Service; "Seed Growing", by T. J. Harrison, B.S.A., and W. T. G. Wiener, B.S.A.; "Pointers on Pig Raising", by F. S. Jacobs, B.S.A.; "The Home Vegetable Garden", by J. A. Neilson, B.S.A., and W. T. G. Wiener, B.S.A.; "Garment Making", by Miss Elizabeth Blackburn and "Canning by the Cold Pack Method", by C. H. Lee and Miss R. M. Atkinson. All of these bulletins have been written and issued specially for the contestants in the various contests being conducted throughout Manitoba by the Extension Service of the Manitoba Agricultural College. They are assembled for the use of organizers and as a basis for lessons in elementary agriculture.

SASKATCHEWAN

Interim Report of the Live Stock Commission. Starting with a copy of the Act and then the order-in-council authorizing the commission, this 92-page red book reviews the live stock situation of the world and of Canada particularly. It then reports the comments and conclusions of the commission on complaints, concluding with an appendix giving a series of statistical tables showing the number of cattle, sheep and swine in the different countries of the world, in Canada as a whole, and in each of the provinces, and statements regarding the disposition of live stock at the Union Stock Yards at Winnipeg, of the number of live stock slaughtered at inspected establishments in Canada since the inception of the system in 1908, the exports of live meat animals, meat and meat products from the different countries at specified periods, the imports into Canada, the sources of supply, and the monthly shipments for 1914 and 1915 from Saskatchewan.

BRITISH COLUMBIA

Report of the Director of Elementary Agricultural Education for the Province of British Columbia—reprinted from Public Schools

Report, 1915-16. In this report J. W. Gibson, Director of Elementary Education reviews the history and development of agricultural teaching in the province since its first introduction as a subject of study in the common and graded schools, and the progress of the school-garden movement. Special attention is also given to the subjects of home gardens, school ground improvement, provincial schools, nursery and agriculture in high schools. Many illustrations clearly reveal the progress that has been made in agricultural teaching and school ground improvement.

MISCELLANEOUS

Faunas of Canada, by P. A. Taverner, Department of Mines, Ottawa, and *Flora of Canada*, by J. M. Macoun, C.M.G., F.L.S., Assistant Botanist and Naturalist, Department of Mines, and M. O. Malte, Ph. D., Dominion Agrostologist, Department of Agriculture, Ottawa, are two pamphlets reprinted from the Canada Year Book for 1915. They deal as thoroughly as the brief space of 8 and 12 pages will allow with the history, nature and characteristics of the subjects referred to. They are both informative and interesting. The pamphlet referring to the faunas of Canada is fittingly illustrated.

"How to Attract the Birds", by Frank F. Payne, Secretary of the Dominion Meteorological Service, has recently been issued in pamphlet form by the Canadian Society for the Protection of Birds, with headquarters at Toronto. In addition to pointing out the economic value of birds and methods for their protection, means of attracting them are described and illustrated. The illustrations show different forms of suitable bird houses.

Fertilizers and their Use in Canada.—by Frank T. Shutt, M.A., D.Sc., Dominion Chemist. This is a reprint from the Eighth Annual Report of the Commission of Conservation of an address delivered before its members by Dr. Shutt. Under this subject, Dr. Shutt deals extensively with the employment of commercial fertilizers in Canada, the place they occupy in Canadian agriculture, the results of extensive experiments, and the conclusions drawn from these with regard to their use in Canada. Dr. Shutt has pointed out clearly that commercial fertilizers must be considered as supplementary only to barnyard manure, and that used in this way they have a very practical value.

NOTES

Four new cheese factories are being operated in the province of Manitoba this year. This brings the total up to 26 factories.

Lieut. H. N. Thompson, B.S.A., who occupied the position of Weeds and Seed Commissioner in the Saskatchewan Department of Agriculture has been killed in action, at Vimy Ridge, France.

The position of the Fruit Markets Commissioner for British Columbia left vacant by the resignation of Mr. W. E. McTaggart has been filled by the appointment of Mr. J. A. Grant of Royal Oak, B.C.

Mr. G. A. Williams, District Representative, Ontario Department of Agriculture in Durham county, reports the organization of two egg circles. Both of these circles were organized at the request of local storekeepers and the farmers interested.

His Majesty, King George V., has presented Spey Pearl, a thoroughbred stallion, to the National Breeding Bureau, which has its headquarters at Montreal. This horse is presented by His Majesty, The King, to encourage the breeding of remounts in Canada.

On page 284 of the April GAZETTE it was stated that funds for making advanced payments on poultry sold co-operatively in Saskatchewan were obtained from the provincial treasury under THE AGRICULTURAL INSTRUCTION Act, whereas The Agricultural Aids Act, a provincial measure, was intended.

R. S. Duncan, B.S.A., who for seven years, was District Representative of the Ontario Department of Agriculture in Durham County, has been appointed to the position of Superintendent of District Representatives in Ontario and assistant to C. F. Bailey, Assistant Deputy Minister of Agriculture.

James Laughland, B.S.A., who has occupied the position as District Representative of the Ontario Department of Agriculture for Simcoe county, for the past seven years, has recently accepted a position with the Mond Nickle Company of Sudbury. Mr. F. A. Wiggins who has been acting as assistant to Mr. Laughland will take charge of the office.

The examination papers set by the Ontario Department of Education for entrance into the Normal Schools and Faculties of Education, contain questions dealing with the subjects of poultry diseases and insects attacking plant life, dairy cattle and milk-testing, silo construction, bee-keeping, plant life, soils and soil operations, swine, sheep and good roads.

The position of Assistant Commissioner of Agriculture in Ontario, left vacant by the resignation of W. R. Reek, B.S.A., now Secretary for Agriculture in New Brunswick, has been filled by the appointment of Mr. Justus Miller, B.S.A. For a time Mr. Miller was engaged in District Representative work and latterly was Editor of *The Canadian Countryman*, Toronto.

In the standing field crop competitions conducted in Ontario during 1916, 86 societies entered in one crop and 81 in two crops, making a total of 248 competitions. The minimum number of competitors in a society was 10, 144 societies competed in oats, 40 in potatoes, 34 in corn, 7 in fall wheat, 7 in barley, 6 in spring wheat, 4 in mangels, 3 in turnips, 2 in peas and 1 in clover.

The Hastings County (Ontario) Banner Oats Association sent its Cleaner-Clipper machine to the homes of all its members in the month of March and as a result of this operation over two thousand bushels of seed grain were sold direct to farmer buyers at prices ranging from \$1.00 to \$1.25 per bushel. The machine was also used in the cleaning of timothy, clover and millet seed, all of which was also disposed of locally at good prices.

Through the instrumentality of the District Representatives of the Ontario Department of Agriculture, several live stock organizations have recently been formed. Among these are the "Merlin Horse Breeders' Club" in Kent County, the "Mono Mills Live Stock Improvement Association", and the "Live Stock Improvement Association of Gorham Township" in the Thunder Bay district. These clubs are organized with the purpose in view of taking advantage of the policy of the Federal Live Stock Branch by which substantial assistance is given to such clubs in the selection, maintenance and use of pure-bred sires.

Seventy-five Herefords at \$131,250. The bull Martin Fairfax at \$17,000. The cow Mousel's Empress with a heifer calf at foot by Woodford at \$5,000. An average of \$2,380 for 25 bulls, sons and grandsons of Perfection Fairfax. And no animal selling under \$1,000. This is the record in brief of a sale in Indiana, on May 16th.

The British Columbia Department of Agriculture is this year giving assistance to women's institutes holding flower shows or an exhibition of women's work or a combined flower show and such exhibition. Prizes are also being offered by the Department for competition at such shows for collections of bulbs, sweet peas, roses, dahlias, perennials or other varieties of flowers as may be decided upon by the institute.

A conference of agricultural representatives of twenty-two states with the Secretary of Agriculture of the United States, was held in St. Louis on April 9th to discuss the agricultural situation in the present crisis. The states were represented by sixty-five officials and the Department of Agriculture by the Secretary of Agriculture and the Chief of the Bureau of Plant Industry and the Office of Markets and Rural Organization. After a thorough discussion of the major problems involved the conference took up the subject matter in four divisions, as follows:

1. Production and labour.
2. Distribution and prices.
3. Economy and utilization.
4. Effective organization.

A representative committee of fifteen was appointed by the conference to formulate its views on these subjects and to submit suggestions for courses of action. Sub-committees were appointed by this committee to deal with each of the enumerated matters. After consideration had been given to the reports of the sub-committees the main committee presented its views, in which courses of action were recommended.

The increase of production agitation has given great impetus to the boys' and girls' clubs in New Brunswick. Conferences, in particular to urge the co-operation of the girls, were held in the first half of May at all the principal centres of the province.

A big gopher drive was set to take place in Manitoba from May 1 to 5. Prizes amounting to \$300 were distributed for the greatest number of tails of gophers shot, poisoned or trapped, for photographs and for essays on the gopher and its habits. Business firms in Winnipeg, the provincial Department of Agriculture and Professor Jackson of the Agricultural College gave the prizes. School children and school teachers were especially invited to compete.

The seventh months' report in the Sixth International Egg-Laying Contest, held under the auspices of the British Columbia Department of Agriculture, has just been made public. This report being for the month ending May 5th, 1917, shows that in class (1) Light Weight Varieties, there were 2,623 eggs laid during the month, the highest number for any one pen being 145. In class (2) Heavy Weights, the total number of eggs laid was 2,190, the highest number being laid by any one pen being 151.

The Department of Agriculture for Saskatchewan and the staff of the College of Agriculture at Saskatoon, have completed arrangements for the "Better Farming Special" which will cover a number of the C. P. R. and G. T. P. lines in the Province from June 4th until June 30th. The equipment of the train will consist of displays in live stock, field husbandry, farm mechanics, building plans, poultry and household science. Those in charge of the various exhibits will be Professor A. M. Shaw, Professor J. Bracken, Professor Greig and Professor Baker. In charge of household science, Miss Jean Archibald; boys' and girls' car, Professor F. W. Bates; kiddies' car, Mrs. Kirke and Miss Gillespie.

INDEX TO PERIODICAL LITERATURE

- Fruit and Farm Magazine*, Vancouver, B.C., May, 1917.
Codling Moth Control, R. C. Treherne, Dominion Field Entomologist, page 4.
- The Agricultural Journal*, Victoria, B.C., April, 1917.
Fire-blight is One of the Orchardist's Greatest Enemies. Slight Relaxation of Vigilance at the Present Time May Have Serious Consequences. J. W. Eastham, Provincial Plant Pathologist and Entomologist, page 27.
- May—The Care of Milk and Cream. How British Columbia Dairymen Can Improve Their Products and Defeat Outside Competition, Geo. H. Barr, Chief, Dairy Division, Department of Agriculture, Ottawa, page 44.
- May—Get Rid of the Ticks, T. Reg. Arkell, Chief, Sheep and Goat Division, Department of Agriculture, Ottawa, page 47.
- The Grain Growers' Guide*, Winnipeg, Man., April 25th, 1917.
Trees and Shrubs to Plant, Norman M. Ross, Superintendent Indian Head Forestry Station, page 736.
- May 2—The Problem of Crop Production, John Bracken, Professor of Field Husbandry, University of Saskatchewan, page 779.
- May 9—Potato Growing in the West, John Bracken, page 819.
- May 9—Growing Farm Vegetables, Professor F. W. Brodrick, Manitoba Agricultural College, Winnipeg, page 831.
- The Maritime Farmer and Co-Operative Dairymen*, Sussex, N.B., April 14th, 1917.
The Place of Roots in our Farm-Scheme, page 389.
- The Farmer's Advocate*, London, Ont., April 19th, 1917.
The Efficiency of the Dairy Cow, page 674.
- May 10—Rural Schools and the Public Health, page 788. Canada's Two Hundred Million Dollar Industry—A Review, page 792.
- May 17—Some Everyday Views on Contagious Abortion, page 829. The Milking Machine as a Labour Saver, Geo. W. Muir, Assistant Dominion Animal Husbandman, page 833.
- The Farmers' Advocate*, Winnipeg, Man., April 25th, 1917.
Aberdeen-Angus Cattle, Kenneth McGregor, page 639.
- May 9—Points in Planning the Barn, Professor of Animal Husbandry, University of Saskatchewan, page 716.
- May 16—Resume of Western Canada's Wool Industry, page 747.
- May 16—How to Tell Sow Thistle from Glue Lettuce, V. W. Jackson, Professor of Botany, Manitoba Agricultural College, page 751.
- The Saturday Press and Prairie Farm*, Saskatoon, Sask., April 14th, 1917.
Our Cream and Butter Grading System, K. G. MacKay, Professor of Dairying, University of Saskatchewan, page 4.
- May 12—Preparing Horses for Summer Work, E. S. Archibald, B.A., B.S.A., Dominion Animal Husbandman, page 7.
- The Canadian Countryman*, Toronto, Ont. Don't Starve the Trees—Grow More No. 1 Fruit, Daniel McKee, B.S.A., page 615.
Prospect for Dairymen in Season That's Opened, Professor H. H. Dean, page 649.
- The Nor'-West Farmer*, Winnipeg, Man., May 5th, 1917.
Shearing and Dipping the Farm Flock, W. H. J. Tisdale, University of Saskatchewan, page 523.
- May 21—The Best Cow for the Western Farm, G. H. Hutton, Superintendent, Experimental Farm, Lacombe, page 591.
- May 21—Operating Mechanical Milkers, Geo. Muir, B.S.A., Assistant Dominion Animal Husbandman, page 605.
- The Canadian Horticulturist and Bee-Keeper*, Toronto, Ont., May, 1917.
Celery Growing, A. H. McLennan, O.A.C., Guelph, Ont., page 149.
Bee-Keeping in Relation to Horticulture, R. M. Muckle, Secretary, Manitoba Bee-Keepers' Association, Winnipeg, Man., page 159.
- Canadian Farm*, Toronto, May 18th, 1917.
The Corn Crop of Prime Importance page 2.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, Institute Commissioner, Department of Agriculture, Ottawa.

Unless application through the Canadian Commissioner is preferred, the original Institute Bulletins may be obtained direct from the General Secretary of the International Insti-

tute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1057.—**Agriculture in Brittany.**—I PIC G. Monograph on a model farm in Ille-et-Vilaine. *La Vie agricole et rurale*, Year 6 No. 27, Paris, July 1st 1916, pp. 1-4, 4 figs.—II. PARISOT F., Improvement of dunes. *Ibid* pp. 5-7, 4 figs.—III. MIÈGE EM., Cultivation of gorse. *Ibid* pp. 13-16, 2 figs.—IV. MENARD A., Cultivation of early potatoes in the Côtes-du-Nord. *Ibid* pp. 18-20, 2 figs.—V. VINCENT V., Market gardening combined with horse raising in Leon. *Ibid* pp. 20-22.

I. The author describes a typical small farm of 35 acres in Ille-et-Vilaine. Without following a rigid rotation the farmer aims to cultivate each year about 7 acres of wheat, 5 of oats, 2½ of barley, 2½ of buckwheat, 5 of clover, 2½ of turnips, besides small patches of green rye, vetches, forage beets, corn, carrots and potatoes. All the slopes are planted with gorse.

II. The dunes of Brittany occupy thousands of acres. Much of this area has been reclaimed and is being successfully cultivated.

III. Gorse is used extensively as a

forage in Brittany, two or three pounds being considered equal in nutritive value to one pound of good hay.

IV. Early potatoes are cultivated in the district known as "the golden belt of Brittany" where the climate is specially suitable. The varieties most used are:—*Royale hative*, very resistant to frost, *Mayette*, *Sutton*, *Fluke geante*, very prolific, and *Fin de siecle*. The seed potatoes are very carefully chosen, only well formed ones of medium size being used. Towards the end of the autumn they are placed to germinate in the light, on garret floors or in boxes with lattice-work bottoms. They are planted about the end of January. They are carefully carried in baskets or wooden boxes and planted after the plough or with the hoe, in well worked soil. Planting is done very thickly, in rows from 13 to 14 inches apart, and about 9 inches apart in the rows. A crop of from 150 to 220 bushels per acre is obtained. After the potatoes are harvested a crop of beets, turnips and cabbage is raised. In the following year a good crop of wheat may be raised without manure.

1058.—**Blind Soldiers and Agriculture.**—BARONNE THENARD A., in *Comptes*

Rendus des Séances de l'Académie d'Agriculture de France, Vol. II, 1916, No. 21, pp. 595-602, Paris, 1916.

Since the beginning of the war the Valentin Haüy Association has been replacing blind soldiers in their former environment, recognizing that, although there may be vocations specially suitable to the blind, it is however preferable, as far as possible, to return the man deprived of sight to his accustomed life and occupation. The return of blind soldiers to agriculture is all the more important because there is such a large number belonging to that occupation.

The Valentin Haüy Association has for a long time kept in touch with blind persons engaged in agriculture. In one case a vine-grower, who became blind at forty, continued his occupation for many years. Another, blind from infancy, and brought up in an institution where he was taught chair-mending and turnery, preferred farming and succeeded in many different tasks involved in it. The Association used this man to encourage blind soldiers who had been farmers before the war to return to the land. They engaged him in July, 1915, to make a series of visits to certain blind soldiers who were back in their homes, and try to give them confidence in themselves and show them, by his example, what things they could do. The results were very encouraging.

One blind man, who had been an agricultural labourer for nine years, showed considerable skill in his work. Another showed equal aptitude for farming, and in addition looked after by himself 50 hives of bees, doing most of this work at night. Recently the Association heard of a blind soldier, very deaf, and with an injured arm, who had been a farmer before the war. In spite of his disabilities he returned to his farm and began to work at gardening and pruning vines.

It goes without saying that the good-will and the assistance of those about him is necessary to the blind man, and for that reason he can remain a farmer only with his family or at home.

Finally the Association is at present engaged in establishing a little school for instruction in poultry raising in order to initiate blind soldiers into an occupation which experience in England has shown to be particularly suitable to them.

CROPS AND CULTIVATION

1061—Can the Fertility of the Soil be Determined by Chemical Analysis of Plants?—SAVIN, P. In the Review of Experimental Agriculture, Vol. XVII, No. I, pp. 1-12, Petrograd, 1916.

1062—The Influence of Relative Area in Intertilled and Other Classes of Crops

on Crop Yields.—BRODIE, D. A., in United States Department of Agriculture, Office of the Secretary, Circular 57, pp. 1-8, Washington, D.C., March, 1916.

1063—"Tetraphosphate,"—VINASSA G. in *Le Stazioni Sperimentali Agrari Italiane*, Vol. XLIX, pp. 357-365, Modena, 1916.

Chemical researches on a new fertilizer put on the market under the name of "tetraphosphate."

1064—Experiments in Inoculation of Lucerne Made from 1912 to 1916 at Hawkesbury Agricultural College, New South Wales.—HEINRICH, J. O., in *Agricultural Gazette of New South Wales*, Vol. XXVII, No. 5, pp. 305-313, 1 fig., Sydney, May, 1916.

1065—The Science of Botany Applied to Agriculture.—HOWARD ALBERT. In *Agricultural Journal of India* (Special number of the Indian Science Congress), pp. 14-26, Calcutta and London, 1916.

When the literature of agriculture is studied it is seen that there exists a certain confusion of ideas with regard to the exact relation between the science of botany and practical agriculture. In this article an attempt is made to emphasize the importance of a scientific knowledge of the vegetable kingdom in connection with agricultural production. Such a knowledge constitutes one of the first conditions of success in applied agriculture. The author deals with the subject under the following heads: the progress in the science of botany; relations between botany and agriculture; increase in the production of a given plant; treatment of plant diseases, and the creation of selected varieties.

1066—A Biochemical Study of Nitrogen in Certain Legumes.—WHITING, ALBERT, in University of Illinois Agricultural Experiment Station, Bulletin No. 179, pp. 471-542, 28 figs. Urbana, Illinois, March, 1915.

1069—Correlated Characters in the Selection of Corn.—COLLINS, G. N., *Journal of Agricultural Research*, Vol. VI., No. 12, pp. 435-453, Washington, D.C., June, 1916.

1071—Case of Variation Observed in the Potato in Holland.—VAN LUIJK, in *Cultura*, 28th Year No. 332, pp. 124-127. Wageningen, 1916.

1072—Experiments in Crossing Between Two Forms of Sunflower (*Helianthus Annuus* L. x *H. Agrophyllus* A. Gray) to Obtain a Form Resistant to Rust in Russia.—SAZYPEROV F. A., in *Bulletin of Applied Botany*, Year IX, No. 5 (90), pp. 228-244, Petrograd, May, 1916.

In his conclusions the author states that these experiments have given an important

result from the practical point of view; that by crossing there may be obtained a form of sunflower resistant at the same time not only to *Homoeosoma nebulella* Hb. and to *Orobancha cumana* Wall., but to *Puccinia Helianthi* Schr.

1073—Results of Twenty Years of Experiments with Corn at the Ohio Agricultural Experiment Station.—WILLIAMS, C. G., and WELTON, F. A., in Bulletin of the Ohio Agricultural Experiment Station No. 282 pp. 71-109, Ohio, 1915.

The Institute Bulletin gives under 25 heads a 6-page summary and conclusions. The United States Bulletin deals with the experiments in 34 interesting tables.

1075—Experiments in the Cultivation of Peaty Soils in Russia.—FOMINYKH, V. A., in Agriculture and Sylviculture, Vol. CCLI, Year LXXVI, pp. 145-160, Petrograd, June 1916.

1076—Chemical Composition of Lucerne with Regard to the Time of the Harvest and the Manner of Harvesting.—SWANSON, C. O., and LASHAW, U. L., in The Journal of Industrial and Engineering Chemistry, Vol. 8, No. 8, pp. 726-729, Easton, Pa., August 1916.

Researches on the chemical composition of lucerne in two successive harvests, one, that of 1914, a very dry season, and the other, that of 1915, an exceptionally wet one. The results are given in a table in the original article.

From the experiments it is shown that the nutritive value of lucerne hay depends not only on mechanical losses due to the manipulation and changes due to bacterial action, but also on chemical transformations hitherto little studied.

1077—Studies of the Timothy Plant.—WATERS, H. J., in University of Missouri, College of Agriculture, Agricultural Experiment Station, Research Bulletin No. 19, pp. 1-68. Columbia, Missouri, June 1915.

The fundamental question which these experiments sought to answer is the stage of development of the timothy plant at which harvesting should take place in order to produce the largest quantity of hay of the highest feeding value and of the greatest market value. The studies began in 1896 and were continued until 1909. In the experiments the timothy was harvested at different stages of maturity; (1) about June 12 when the plants were just in full head; (2) about June 20 when in full bloom; (3) about July 1 when the seed had formed; (4) about July 8 when the seed was in dough; (5) about July 16 when the seed was ripe but not shattered.

The second cutting, when the plants were

in full bloom, gave the highest yield of digestible dry matter, digestible protein, fats and nitrogen-free extracts.

With regard to the manner in which palatability is affected by the time of cutting, yearling steers preferred the early cut hay, their order of preference being the same order in which the hay was cut. Dairy cows preferred the hay of the three first cuttings, while full-fed sheep indicated no preference.

Early cutting shortens the life of the meadow.

1083—The Production and Cultivation of Medicinal Plants in France.—*Feuille d'Informations du Ministère de l'Agriculture*, Year 21, No. 28, pp. 12-13, Paris, July 14, 1916.

1084—Summer Treatment of Greenhouse Soil.—GREEN, W. J., and GREEN, S. N., in Ohio Agricultural Experiment Station Bulletin No. 281, pp. 53-68, Wooster, Ohio, 1915.

For an interval of six to ten weeks during mid-summer vegetable greenhouses usually stand idle because outside vegetables are at the time abundant. Yet the vegetable greenhouse man does not consider it necessary to renew his soil annually, his opinion being that the intense heat under glass during July and August, together with the dryness of the soil, will destroy all insect life as well as fungi and bacteria. This view is open to serious doubt, and experiments were made with several vegetables with the following results:

(1) Lettuce may be cultivated for several years on unrenewed soil regularly manured.

(2) Tomatoes and cucumbers are affected by the conditions observed in old soils, and the yields are rapidly reduced.

(3) Desiccation of the soil during the idle periods is unfavourable to tomatoes but not to lettuce.

(4) Manuring in the summer is recommended as a means of remedying the conditions of the soil unfavourable to tomatoes and cucumbers.

(5) The application of manure during the summer does not seem to do away with the necessity of sterilizing the soil, but may replace in part such sterilization.

1085—Varieties of Grapefruit Grown in California.—SHAMEL A. D., in California State Commission of Horticulture Monthly Bulletin, Vol. V, No. 7, pp. 239-249. Sacramento, Cal., July 1916.

LIVE STOCK AND BREEDING.

1088—Metabolism of the Organic and Inorganic Compounds of Phosphorus.—FORBES, E. B., BEEGLE, F. M., WHITTIER, A. C., FRITZ, C. M., COLLISON, R. C., WOODS, H. S., and KNUDSEN

C. W., in Ohio Agricultural Experiment Station, Technical Series, Bulletin No 6, 80 pp., Wooster, Ohio, 1914.

1089—Influence of the Nature of the Ration on the Power of Retaining Protein.—UMEDA, N., in *Biochemical Journal*, Vol. X, No. 2, pp. 245-253, London, June 1916.

1090—Influence of Phosphates in the Feeding of Cattle.—PICCININI MARIO in *La Clinica Veterinaria*, Year XXXIX, No. 13-14, pp. 383-394, Milan, July, 1916.

1094—The Ration and Age of First Calving as Factors Influencing the Growth and Dairy Qualities of Cows.—ECKLES, C. H., in University of Missouri Agricultural Experiment Station, Bulletin No. 135, 91 pp., Columbia, Missouri, Sept. 1916.

The following are the conclusions of the author: It is possible to influence the rate of growth, size when mature, and type to some extent, by the liberality of the ration during the growing period, and the age at first calving. Within limits of variation, even far beyond the normal, the character of the ration with reference to amount of nutrients supplied does not exert any appreciable effect upon the milking functions of the cow when mature. The age at first calving is a factor of some importance with reference to the development of the milking function of the cow. Calving at an extremely early age is detrimental to the best development of the milking function while nothing is gained by too great delay.

1095—Observations on the Production of Milk Cows on Several Yorkshire Farms and on the Cost of Concentrated Feeds in Relation to Production.—CROWTHER, Ch., and RUSTON, A. G., in The University of Leeds and the Yorkshire Council for Agricultural Education Bulletin No. 98, pp. 1-37, Leeds, 1915.

1096—Experiments in Feeding Milk Cows in Denmark.—LUND, A. V., in *Compte Rendu du Laboratoire d'essais de Copenhague* (Communicated to the Institute by its Danish Correspondent, Baron Rosenkrantz).

1103—Experiments in Swine Feeding at the Wyoming Agricultural Experiment Station.—FAVILLE, A. D., in University of Wyoming Agricultural Experiment Station, Bulletin 107, pp. 15-27, Laramie, Wyoming, Sept. 1915.

The following conclusions were reached; Pea pasture gave good returns in fattening rations; Hurdling pea pasture effected a large saving of peas; Pigs that had been on pasture previously made better gains when put on dry feed than did pigs that had had no pasture; Returns from an acre

of pea pasture were good; Cross-bred and pure-bred made practically the same gains; Alfalfa tea added to a ration increased gains though it did not appear to be of much value; Barley meal proved equal to corn meal for young fattening pigs; Alfalfa hay gave better returns in maintenance rations for brood sows than did pea hay; A mixture consisting of four parts corn meal and one part alfalfa meal proved less satisfactory as a fattening ration for brood sows than did corn meal alone.

1105—Annual Report of the British Berkshire Society.—Farmer and Stock Breeder, Vol. XXIX, No. 1406, p. 1453, London, Sept. 1916.

A table gives the numbers of exportation certificates given during the last ten years. A total of 2181 certificates were issued, 999 for animals exported to Argentina, United States 147, Canada 136, Russia 129, and Brazil 127. The report emphasizes the precocity of the race, and indicates the weights obtained at maturity and at six months. The average weight of sows at six months under normal conditions and with sufficient exercise was 144 lb. and boars 155 lb. At the end of one year breeding sows weighed 400 to 500 lbs. and boars attained 600 lbs.

1106—Influence of Constitutional Vigour in Poultry on their Production.—RICE, J. E., and ROGERS, C. A., in Cornell University Agricultural Experiment Station of the College of Agriculture, Department of Poultry Husbandry, Bulletin No. 345, pp. 439-457. Ithaca, N.Y., 1914.

The selection of fowls for strong vitality, even though such selection be slight and exercised but once, increases the productive powers of a flock; one selection is, however, not sufficient to keep a flock superior. Selection of mature pullets is of more value than of partly grown chickens.

1107—Rations for Growing and Fattening Roasters and Capons.—BUSS, W. J., in Bulletin of the Ohio Experiment Station No. 284, pp. 155-172. Wooster, Ohio, 1915.

FARM ENGINEERING.

1110—Machinery Cost of Farm Operations in Western New York.—MOWRY, H. H., in Bulletin 338, United States Department of Agriculture, Washington, D.C., January 1916.

1112—Gasoline Tractor for Digging Drains.—PERKINS, FRANK, in Engineering Record, Vol. 74, No. 5, p. 134, New York, 29 July, 1916 (illustrated).

1113—Sterilizer of Simple Construction for Dairies.—AYERS, HENRY and TAYLOR, GEORGE R., in Farmer's Bulletin No. 748, Washington, D.C., July 22, 1916.

RURAL ECONOMICS

- 1114—**Farm Management Practice of Chester County, Pa.**—SPILLMAN, N. J., DIXON, H. M., and BILLINGS, G. A., in United States Department of Agriculture, Bulletin No. 341, Washington, D.C., January 1916.

This statement of the Office of Farm Management comprises an analytical study of 643 farms in the county of Chester, Pa., made in order to work out a method of studying regional farm management problems, to discover fundamental principles of farm management and to work out the application of these fundamental principles to the agriculture of a definite agricultural region.

Tables are given showing changes in the agriculture of the county, utilization and value of the land, percentage of area devoted to each crop, numbers of animal units per 100 acres of crops, proportion of income from various enterprises, percentage of receipts from different sources, relation of size of farm to labour income, relation of size of farm to use of labour saving equipment, and distribution of expenses in different enterprises.

- 1116—**Influence of the Distance to Market on the Value of Rural Real Estate in Missouri.**—JOHNSON, O. R., in *Freeman's Farmer*, Vol. 70, No. 5, pp. 11, North Jakina, Wash., May 1916.

Statistics gathered concerning 650 farms in the county of Johnson, show the following:

CLASSES	Distance to Market, Miles	Number of Farms in the Class	Average Value per Acre
I	2	79	\$78
II.	4	183	70
III	6	126	60
IV	8	113	56

AGRICULTURAL INDUSTRIES

- 1120—**Pasteurization of Milk in Bottles (1).**—Pure Products, Vol. XII, No. 8, pp. 385-392. New York, August, 1916.

At present milk is pasteurized by three different methods: (1) the continuous or "flash" method; (2) the intermittent or "holder" method; (3) pasteurization in bottles, which is the most modern process.

These methods, and especially the third, are fully discussed.

(1) See also Bulletin of Foreign Agricultural Intelligence, January, 1916, No. 1085.

- 1121—**Studies of the Digestibility of Veal from Calves a few Days Old (1).**—LANGWORTHY, C. F., and HOLMES, A. D., in *Journal of Agricultural Research*, Vol. VI, No. 16, pp. 577-588, Washington, D.C., July 17, 1916.

(1) See also Bulletin F.A.I., September, 1916, No. 455.

- 1123—**Tendency towards Levelling in the Prices of Fresh and Frozen Meats.**—SAGNIER, H., in *Comptes rendus des séances de l'Académie d'Agriculture de France*, Vol. II, No. 16, pp. 477-481, Paris, 1916.

After a study of the prices of fresh and frozen meats over a series of years the author concludes that the difference in the prices is diminishing. The use of frozen meats does not now realize the saving which was expected two years ago.

PLANT DISEASES

- 1125—**The Powdery Mildews of Avena and Triticum.**—REED, M. G., in University of Missouri, College of Agriculture, Agricultural Experiment Station, Research Bulletin No. 23, 19 pp., Columbia, Missouri, 1916.

- 1126—**Experiments on the Wintering of the Teleutospores of the Rust of Gramineae.**—KLEBAHN, H., in *Zeitschrift für Pflanzenkrankheiten*, Vol. 26, part 5, pp. 276-277. Stuttgart, July 30, 1916.

The teleutospores of rust of gramineae which have wintered in the ground, germinate in the following spring at least as well as those which wintered in the open. In practice it results that the stubble of attacked cereals after a winter in the ground may affect in the following spring, not the cereal itself, but the host of the acedies.

- 1128—**Sclerospora Macrospora in Spain.**—ARROPHELES, in *El Cultivador Moderno*, Year VI, No. 4, p. 4. Barcelona, 1916.

In the province of Huesca in 1915, there was a 40 per cent loss in the wheat crop on account of an attack of *Sclerospora macrospora*. The parasite has not yet been noticed on rice in Spain.

- 1129—**Effects of Different Species of Fusarium on the Composition of Potatoes.**—HAWKINS, L. A., in *Journal of Agricultural Research*, Vol. VI, No. 5, pp. 183-196. Washington, D.C., 1916.

- 1130—**Fusarium Radicicola as a Cause of Rot in Potatoes in the United States.**—PRATT, O. A., in *Journal of Agricultural Research*, Vol. VI, No. 9, pp. 297-309, Washington, D.C., 1916.

- 1135—**Mistletoe Injury to Conifers in the Northwestern States.**—WEIR, JAMES R., in United States Department of Agriculture, Bulletin No. 360, pp. 1-39, Washington, D.C., 1916.

The general nature of injury to conifers by mistletoes is expressed in a gradual reduction of the leaf surface of the host, which causes a great reduction of growth in height and diameter.

As a means of combatting the damage done by mistletoe it is suggested:

(1) To cut and remove infected trees, whether the wood is merchantable or not;

(2) When new nursery sites are planned in or near forests a close pathological survey should be made of the surroundings, and trees diseased or suppressed from any cause should be cut out.

(3) To plant conifers in close stands in order to have as much shade as possible, as the mistletoe is a light-loving plant.

INJURIOUS INSECTS

1137—*Injurious Insects in India*.—FLETCHER, T. B., in *Agricultural Research Institute, Pusa, Bulletin No. 59*, pp. 1-39, Calcutta, 1916.

1138—*Resistance to Cold of the Larvæ of Cossus Cossus and Carpocapsa Pomonella*.—GUEYLARD, F., and PORTIER P., in *Comptes rendus des séances de la Société de Biologie*, Vol. LXXIX, No 15, pp. 774-777, Paris, 29 July, 1916.

The experiments of the authors show that the larvæ of *Cossus cossus* resist even a complete freezing of all their organs and tissues. The freezing may be repeated on the same larva many times without injuring it. The larvæ of *Carpocapsa pomonella* show equal resistance to freezing.

1139—*Observations on the Parasites of Certain Coccidae*.—IMMS, A. D., in the *Quarterly Journal of Microscopical Science*, Vol. 61, 3rd part, pp. 217-274. London, 1916.

This work is the first of a series treating of the biology of the principal insect parasites of certain *Coccidae*. The work contains a very complete bibliography and is well illustrated.

1144—*Termites, or "White Ants" in the United States*.—SNYDER, T. E., in the *United States Department of Agriculture, Bulletin No. 333*, pp. 1-32, Washington, D.C., 1916.

1148—*Agallia Sanguinolenta ("Clover Leafhopper") Injurious to Forage Plants in the United States*.—GIBSON, E. H., in the *United States Department of Agriculture, Farmer's Bulletin No. 737*, pp. 1-8, Washington, D.C., 1916.

The clover leafhopper is especially injurious to clover and lucerne. As many as 600 will gather on one plant, piercing the skin of leaf and stem and sucking the juices. The incessant drain causes the plants to wither and, though they may not die, the new growth which is put forth is very apt to be thin and spindling. Besides the eggs are forced into the stem and leaf tissue, causing a distortion of the surrounding tissue, often resulting in a gall-like formation.

Methods of control: (1) burning during the winter of rubbish and vegetation in waste places such as ditch banks, fence rows and roadsides; (2) if the attack is serious the lucerne should be cut a week or ten days earlier than usual; (3) capturing the insect by means of an apparatus called a "hopperdozer".

AGRICULTURAL ECONOMICS

STATE HAIL INSURANCE IN NORTH DAKOTA

North Dakota has been the first and so far the only State in the Union which has placed a law for the State insurance of crops against loss or damage by hail on its statute books. The venture is therefore highly important as a test of the ability of the State, from a practical standpoint, to compete with privately owned and managed insurance enterprises. We will examine the provisions of the Act and the results as set forth in the two biennial reports so far issued by the Commissioner of Hail Insurance.

The State Hail Insurance Act of North Dakota first went into operation in January 1911, and after two years' experience was amended in 1913.

The law as it now stands provides for a Hail Insurance Department which shall insure growing crops in any county in the

State against loss or damage by hail. County, township, city and village assessors, at the time of listing property for assessment each year, are required to inquire of the party assessed how many acres of crop such party may wish to insure for the year, informing him that as a premium for this insurance a payment of 30 cents for each acre insured must be made. As originally enacted, the law had fixed the rate for insurance premium at 20 cents per acre of grain insured, but the experience of the first two years indicated that this rate was too low, and it was therefore raised to 30 cents, as above.

The assessor is required to fill in the forms for all such insurance agreements, to collect the 30 cents per acre with an additional half cent per acre as an application fee, and to forward these forms and moneys to the county auditor, who files the

applications and turns over the moneys to the county treasurer.

The insurance is in force and effect from the time of filing the application in the office of the county auditor until the grain is cut, but in no case later than September 15th of each year.

On the 1st of June, July and August, the county auditors make a list of all hail insurance applications filed with them, and forward same to the Department of Hail Insurance at the State capital, Bismarck.

Meantime, the county commissioners at their April board meeting shall appoint for each county a competent resident to act as official adjuster of losses and damage caused by hail to any crop insured under the act. The State Commissioner of Hail Insurance must be notified by the county auditors of such appointments which only become valid on receiving his approval, and he has power to remove or discharge any such official adjuster for incompetency or neglect.

It is the duty of these official adjusters to adjust losses or damages caused by hail to crops within their districts insured under the act.

When any party thus insured has sustained loss by hail he promptly notifies the Commissioner of Insurance, who directs an official adjuster to visit the place and estimate and adjust the loss. In so doing it is his duty carefully to inquire into the conditions of the crop before the loss occurred, as to whether it was poor, medium, or good, and if he deems it necessary he has power to call witnesses to testify as to the said condition, and he shall make his estimate and adjustment after ascertaining the condition before and after the loss occurred. In estimating the loss the adjuster shall allow as damages the proportion which the crop as damaged bears to the crop if no such loss had occurred. If the total value of the crop insured be less than eight dollars per acre then in case of total loss the insured shall receive the total value thereof; if the loss be partial he shall receive that percentage of value which the loss bears to the total value of the crop insured. If the value of the crop be more than eight dollars per acre, the insured shall receive that percentage of the maximum of eight dollars which the loss bears to the total value of the crop, provided however that in no case shall more than eight dollars per acre be allowed as the maximum for wheat, flax, oats, barley, corn, rye, and other grains.

Should the party insured refuse to accept the adjustment made by the official adjuster he shall have the right to appoint one disinterested person as adjuster and the official adjuster shall appoint another, and the two shall elect a third, and the three shall then proceed to adjust the loss in the manner above described, the judgment of the majority to be binding upon

both parties as the final determination of said loss.

As compensation for their services the official adjusters receive five dollars a day and actual expenses while engaged in the performance of their duties, and all persons called to assist them in adjusting losses shall receive \$2 a day while so engaged.

The Commissioner of Hail Insurance, on receiving from the county auditors the complete returns showing the number of acres insured for the year, shall sum up the total hail insurance fund available for that year; when he shall have received a complete return from all of the hail losses in the State as adjusted and allowed he shall sum up the total of such amounts for that year, and he shall sum up the expenses of his office in accordance with rules prescribed in the Act. The total of such expense account shall first be deducted from the total amount of the hail insurance receipts for that year and paid, and if the balance remaining is sufficient all hail losses shall be paid in full as allowed by the adjusters, but if the expenses and hail losses shall exceed the amount of hail insurance receipts for that year, the expenses shall be paid first and the losses shall be paid pro rata. Should there be a surplus after expenses and losses, such surplus shall remain in the State treasury in the hail insurance fund to be drawn upon in future years in which there may be a deficiency.

When the Commissioner of Hail Insurance has figured up the whole year's business as indicated above, he shall prepare and furnish to the State auditor a certified list of the losses arranged by counties, with the names and addresses of persons who have suffered loss and are entitled to compensation, the appraised losses, and the amount to be paid to each person. The State auditor shall then draw warrants for these amounts upon the State treasurer, to be charged to the hail insurance fund, and such warrants shall be mailed forthwith to the persons entitled thereto.

Hail Commissioner W. C. Galbreath in drawing up the first biennial report dealing with the years 1911-1912 remarks:

"The fact that the State had entered the insurance field subjected the law and its methods to criticism, and its low rate was made the target of ridicule by those who were opposed to the measure. During the year 1911 there were 1,011 policies written and \$26,109.44 collected in premiums. When the expenses of conducting the affairs of this company, including books, stationery, salaries and fees for adjustment of losses, which amounted to \$3,421.63, leaving a balance of \$1,129.33 for future contingencies, were deducted, there was distributed among the policy holders the sum of \$21,188.03, or seventy cents on the dollar for the losses sustained."

The year 1912 showed a large increase of business over 1911; 2,205 policies were written; the total revenue received amounted to \$63,840 and the disbursements to \$63,164, leaving a balance of \$3,175 in the State treasury for future contingencies. The fees obtained were distributed as follows:

Paid deferred losses of 1911	\$ 858.40
Agents adjusting losses, during 1912	2,447.62
Losses for 1912	57,986.69
Clerk hire	2,160.00
Postage	43.00
Printing	103.40
Advertising	9.95

1912 was an exceptionally hard year for hail insurance, and the losses from this source were probably unprecedented in North Dakota. The State Insurance department was therefore only able to pay fifty-five cents on the dollar for losses incurred but the adjustments were made on a very liberal basis.

It was then that it became apparent that the rate of 20 cents per acre insured was an inadequate premium, and it was urged that the charge should be raised to 30 cents, which was done when the Act was amended in 1913. An alternative to raising the premium suggested in the report of 1912 was that the legislature should fix a minimum rate of five cents or less per acre, and levy a general tax on all real estate in accordance therewith, thus covering insurance for all, and making a rate so low and satisfactory that hail insurance would not be a burden to any; but, as we have seen, the advocates of a higher premium rate won the day.

The second biennial report, issued in December 1914, sums up the four years' work then accomplished as follows: the losses incurred in 1911 were settled on the basis of seventy cents on the dollar; in 1912 fifty-five cents on the dollar; in 1913 eighty-eight cents; and in 1914 sixty-five cents on the dollar.

These results must be considered as decidedly unfavourable, for if applied to a mutual hail insurance company they would mean that members would be required to pay, in addition to the regular premium, extra assessments respectively,

of 30 %, 45 %, 12 %, and 35 %, and by that time, as the report points out, members would probably have had quite enough of mutual insurance.

But in analysing the results of this venture into the realm of State hail insurance certain facts and factors must be taken into account.

During the years 1911 and 1912 the rate charged by the State was twenty cents per acre, or 2½ per cent on the dollar; at the same time the rates charged by the old stock companies ranged from 6½ to 8 per cent on the dollar. The State insured one hundred and sixty acres of grain for thirty-two dollars and fixed the loss maximum at \$1,280. The old stock companies issued the same acreage for not less than sixty-five dollars, with a loss maximum of \$1,000. In other words, the State gave the insured twenty-eight per cent greater value to his crop than did the private companies, while the actual cost was very much less in the former than in the latter case, based upon either total or partial loss. At the same time the loss paying power of the State, based upon the premium income, was insignificant from a comparative standpoint. State hail insurance reached high tide in 1912, when the premium income amounted to \$64,840 while the income in this State of seven private companies averaged in excess of \$152,000 each.

Nor is this all. The stock companies will accept the hazard of only a certain limited amount of insurance in each section or each township, while the State takes the risk of the entire farm, even though it embraces several contiguous sections. Finally, nearly all the private companies write hail insurance in several States, and this wide diffusion of risk naturally minimises the chance of loss.

Thus it will be seen that the State has laboured under the disadvantages of a comparatively low rate, small income, and extreme chance of loss for reasons above noted. On the side of expense of management the advantage is decidedly in favour of State insurance; but even this advantage is largely theoretical on account of the small volume of business transacted.

SYNDICATE FOR MECHANICAL AGRICULTURE IN FRANCE

A certain number of agriculturists in the arrondissement of Pontoise have formed themselves into a trade syndicate in order to acquire traction engines and to undertake without delay ploughing and other agricultural operations which have for the present been suspended.

The capital has been subscribed by the members in proportion to the number of hectares of arable land they hold and has allowed the purchase of the following machines:

18 Emerson 20 horse power traction engines; 6 Arion 40 horse power traction engines; 2 Avery 35 h. p.; 2 Avery 16 h. p.; 3 Avance 20 h. p.; 1 Bull 16 h. p.; that is 32 traction engines at a total cost of about \$100,000.

The activity of the syndicate will affect twenty-two communes, and about 17,800 acres of arable land fitted for the intensive culture of grain and sugar beetroot. The scarcity of agricultural labour in this district—as a result of the mobilization of Belgian workmen, the proximity of factories of war material and the prohibition to employ prisoners of war which was long in force—decided the agriculturists to use these new methods of work as a matter of urgency.

Counting the traction engines already bought by individuals outside the syndicate, there are now forty of these machines in the arrondissement of Pontoise, and the possibility of shortly using double that number ought to be realized.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the February number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletins on application

to the Institute Branch, so long as the supply for distribution is not exhausted.

	Page
The Co-operative Sale of Wool in Canada	14-24
Cattle Insurance in Burma	50-54
Land Tenure and Colonization in Erythrea	67-88
Results of the New Agrarian Reform in Russia	89-107
Reform of the Land Tax in Uruguay	108-116

AGRICULTURAL STATISTICS

FOREIGN CROP CONDITIONS

IN the April number of the Institute Statistical Bulletin the condition of the European grain crops on April 1st was described as follows:

The weather which has prevailed over the whole of Europe for several months has been almost everywhere unfavourable for the crops and many farmers have been prevented by the adverse conditions from making progress with their ploughing and spring sowing. Generally speaking vegetation is very backward, but in most cases a spell of fine weather would set matters nearly right as regards the growing crops. The recent heavy rains have resulted in floods in certain localities and favoured the development of cryptogamic diseases, and have therefore been adverse to cultivation.

The communications, transmitted to the International Institute of Agriculture of Rome by the Governments, indicate that the condition of winter wheat crops was on April 1st an *average* one in France, Italy, Switzerland and Egypt, *mediocre* in Great

Britain and the United States; rye was in *average* condition in France, Italy, Switzerland and the United States; barley was in *average* condition in France, Italy, Switzerland and Egypt, while oats had an *average* outlook in Italy and the United States but were *mediocre* in France and in Ireland.

In a cablegram received from the Institute the condition of growing cereals on May 1st was described as *good* in Tunis, *average* in Spain, Netherlands and Algeria, and *mediocre* in France, Great Britain, Italy and Switzerland.

The winter-wheat crop of the United States, planted last autumn on one of the largest acreages ever sown to that grain, but which met disaster in several important producing States from severe winter conditions, now promises a harvest of 366,116,000 bushels this year. That quantity was forecast by the Department of Agriculture, which based its estimate on the condition of the crop May 1, as reported by the thousands of agents throughout the

grain belt. A month ago a crop of 430,000,000 bushels was forecast. Production last year was 481,744,000 bushels, and in 1915 it was 672,947,000 bushels.

On May 1 the area of winter wheat to be harvested was about 27,653,000 acres, compared with 40,090,000 acres sown last autumn, and 34,829,000 acres harvested last year.

The condition of the crop on May 1 was 73.2 per cent. of a normal, compared with 63.4 per cent on April 1, 82.4 per cent on May 1 last year, and 86.6 the average of the last ten years on May 1.

Production of 60,735,000 bushels of rye is forecast from the May 1 condition, compared with a forecast of 60,000,000 bushels based on the April 1 condition, 47,383,000 bushels produced last year, and 54,050,000 bushels in 1915.

Rye condition on May 1 was 88.8 per cent of a normal, compared with 86.0 on April 1, 88.7 on May 1 last year, and 90.2 the ten-year average on May 1.

Spring ploughing: Was 72.4 per cent completed up to May 1, compared with 70.4 on May 1 last year, and 69.3 the ten-year May 1 average.

Spring planting: Was 58.7 per cent completed up to May 1, compared with 56.7 on May 1 last year, and 56.3 the ten-year May 1 average.

Broomhall's latest crop cable dated May 22nd gives crop conditions as follows:

United Kingdom—Fine weather has caused rapid progress in field work, and spring cereals are all planted. Winter crops are backward, but appear healthy.

Argentina—Fine weather favours plant-

ing, and the Government is assisting to materially increase the acreage.

Australia—Dry weather prevails, and agriculture is impeded. Stocks are large of wheat, and shipments are commencing on a liberal scale. Acreage will be large if weather favours. Seed is plentiful and labour adequate.

France—Fine growing weather has caused a general improvement in crop prospects and official estimates are being slightly raised. Mills are reduced, owing to scarcity of supplies, and food is becoming very scarce. Foreign arrivals are moderate.

Germany—Neutral advices report favourably of crop outlook.

Italy—Slight improvement is noted in crop prospects, but the general outlook is poor, as weather has been bad, labour scarce, and seed not satisfactory.

Spain—Crop prospects are fairly favourable, and weather fine. Native supplies are about exhausted, and foreign arrivals increasing.

Balkan States—Acreage shows a large decrease, and condition, where growing, fair.

Scandinavian countries—Crop promises fair on a reduced acreage, owing to much winter-killing.

North Africa—Harvesting is about finished, and the yield favourable.

Russia—Weather is warmer, but still unseasonably cold, with snow still over a wide area. Winter crops are not favourable, and spring work is very late. Very little grain moving to ports, and north ports are still icebound.

CROPS OF 1916-17 IN THE SOUTHERN HEMISPHERE

COUNTRIES	WHEAT			OATS		
	1916-17	1915-16	Five Years' Average, 1909-10 to 1913-14	1916-17	1915-16	Five Years' Average, 1909-10 to 1913-14
	Bushels	Bushels	Bushels	Bushels	Bushels	Bushels
Argentina	70,225,000	172,651,000	147,071,000	29,912,000	70,853,000	51,063,000
South Africa	4,790,000	4,858,000		6,521,000		
Australia	152,090,000	179,627,000	90,499,000	19,530,000	19,045,000	16,305,000
New Zealand	5,460,000	7,108,000	7,070,000	6,423,000	8,779,000	16,434,000
Totals, omitting South Africa	227,715,000	359,386,000	244,640,000	55,865,000	98,677,000	83,802,000

The production of corn in Argentina is 58,840,000 bushels compared with 161,134,000 last year and 191,699,000 the five years' average. The Argentina flaxseed crop is estimated as 3,996,000 bushels against 39,266,000 last year and a five years' average of 31,567,000 bushels.

THE WHEAT CROP OF INDIA

The following official statement of the recently harvested wheat crop of India has been published by the Institute.

The area harvested in 1917 was 32,961,000 acres compared with 30,142,000 in 1916, a five years' average, 1909 to 1913 of 29,218,000 and a five years' average

1911 to 1915 of 30,537,000 acres. The production of wheat in 1917 is estimated as 370,683,000 bushels compared with 318,-

005,000 last year, a 1909 to 1913 average of 351,767,000 and a 1911 to 1913 average of 360,550,000.

WINTER CEREAL CROPS, 1916-17

COUNTRIES	WHEAT		RYE		BARLEY	
	1916-17	1915-16	1916-17	1915-16	1916-17	1915-16
	Acres	Acres	Acres	Acres	Acres	Acres
Denmark	141,000	151,000	455,000	479,000		
Spain	10,300,000	9,839,000	1,846,000	1,847,000	4,025,000	4,313,000
France	10,579,000	12,440,000	2,046,000	2,746,000	270,000	246,000
Scotland	55,000	63,000				
Switzerland	128,000	113,000	74,000	50,000	5,000	4,000
Canada	626,000	985,000				
United States	27,653,000	34,829,000				
India	32,885,000	30,255,000				
Japan	1,236,000	1,241,000			2,738,000	3,109,000
Algeria	3,141,000	3,272,000			2,852,000	3,000,000
Totals	86,744,000	93,188,000	4,421,000	5,122,000	9,890,000	10,672,000

NUMBER OF LIVE STOCK IN SWEDEN

CLASSIFICATION	NUMBERS ON		
	1 June, 1916	31 Dec., 1914	31 Dec., 1913
Horses	701,089	602,613	596,136
Cattle	2,913,519	2,760,788	2,720,741
Sheep	1,198,369	993,481	988,163
Goats	131,788	77,174	71,051
Pigs	1,065,396	1,014,683	967,684

NOTES ON THE WORLD'S CEREAL SITUATION

BY T. K. DOHERTY

WINTER WHEAT

With the exception of Spain and Switzerland, where the acreage sown to winter wheat has been slightly increased, all the European countries that have so far reported to the Institute exhibit decreases. Among the importing countries there is a decrease in France of 1,861,000 acres, and among the exporting countries a decrease of 7,176,000 in the United States. These are grave indications of the situation that might arise unless the spring crops make good the deficit. Even allowing for the increase of 2,630,000 in India there is in the countries reported a total decrease in acreage sown to winter wheat of 6,444,000. Then there are recorded besides decreases of 701,000 and 782,000 acres respectively in rye and barley.

Fortunately later advices speak of better conditions for the winter crops both in Europe and in America. The impression is gaining that the United States forecast of May 1st underestimated the condition of the winter crop, at least that crop is reported as having recently made very favourable progress.

WORLD'S PRODUCTION OF WHEAT

In order to facilitate comparison with the new grain year, which began in March with the harvest of India, herein elsewhere reported, there is presented here the world's wheat production for 1915 and 1916, revised to date.

WORLD'S WHEAT PRODUCTION, 1915 AND 1916

COUNTRIES	1915	1916
	Busheis	Busheis
North America—		
United States ..	1,025,801,000	689,886,000
Canada ..	426,747,000	220,367,000
Mexico ..	(b) 8,000,000	(b) 8,000,000
Total North America	1,460,548,000	868 253,000
South America—		
Argentina ..	172,651,000	70,225,000
Chile ..	(b) 12,000,000	(b) 12,000,000
Uruguay ..	9,867,000	(b) 8,000,000
Total South America ..	194,518,000	90,225,000
Europe—		
Austria ..	(c) 51,714,000	(c) 48,672,000
Hungary ..	151,407,000	(c) 135,861,000
Belgium ..	(c) 12,661,000	(c) 11,917,000
Bulgaria ..	46,213,000	33,951,000
Denmark ..	7 893 000	5,344,000
France ..	237,806,000	214,624,000
German Empire ..	(c) 129,822,000	(c) 122,186,000
Greece ..	(b) 8,000,000	8,000,000
Italy ..	170,542,000	176,531,000
Herzegovina and Bosnia ..	(b) 1,600,000	(b) 1,600,000
Netherlands ..	6,680,000	4,034,000
Norway ..	284,000	305,000
Luxemburg ..	516,000	(c) 490,000
Portugal ..	(b) 8,000,000	(b) 8,000,000
Roumania ..	89,787,000	78,521,000
Russia-in-Europe ..	746,195,000	596,425,000
Serbia ..	(c) 10,757,000	(c) 10,124,000
Spain ..	139,299,000	152,921,000
Sweden ..	8,763,000	7,775,000
Switzerland ..	3,957,000	4,053,000
Cyprus and Malta ..	(b) 2,400,000	(b) 2,400,000
United Kingdom ..	74,122,000	59,525,000
Total Europe	1,907,418,000	1,682,259,000
Asia—		
British India ..	376 731 000	318,005,000
Japan ..	25,799,000	24,444,000
Russia in Asia ..	143,849,000	86,812,000
Persia ..	(a) 13,600,000	(a) 13,600,000
Total Asia	559,979,000	442,861,000
Africa—		
Algeria ..	34,655,000	38,817,000
Egypt ..	39,148,000	36,543,000
The Cape ..	(b) 2,400,000	(b) 2,400,000
Tunis ..	11,023,000	7,165,000
Total Africa	87,226,000	84,925,000
Australia—		
Total Australasia ..	186,735,000	157,490,000
Grand Total ...	(e) 4,396,424,000	3,326,013,000

(a) From Dornbush's Floating Cargoes List.

(b) From Broomhall's.

(c) The five years' average production (1909-1913) less 15% in 1915 and 20% in 1916.

(e) Broomhall's estimates of January 30, 1917, makes the corresponding total for 1915, 4,171,784,000 bushels, for 1916, 3,292,320,000.

In 1916, as compared with 1915, the foregoing table discloses the following remarkable decreases:—

COUNTRIES	Busheis
North America ..	592,295,000
South America ..	104,293,000
Europe ..	225,159,000
Asia ..	117,118,000
Africa ..	2,801,000
Australasia ..	29,245,000
Total decrease ..	1,070,411,000

In normal times this great reduction in the world's total wheat crop would be serious enough. In the present war it is extremely fortunate that, chiefly owing to the large surpluses from the previous crop, it is not proving disastrous.

SUPPLY AND DEMAND FOR THE GRAIN YEAR 1916-17.—COMPARISON WITH 1915-16

It has been stated that the world's avail-

able production for the five years before the war was 3,931,000,000 bushels. Less than one-sixth of this quantity forms the object of the world's export and import trade, namely, for the five years' average, exports of 624,000,000 bushels and 613,000,000 bushels of recorded imports. Since the war naturally this trade has been seriously hampered. The Central European countries at war with the Allies are practically completely cut off from it, also to a great extent Russia and Roumania. Russia has had available only the northernmost European port of Archangel, ice-bound during the long winter with limited shipping facilities. Completion during the past year of the Murman railway from Petrograd to Alexandroff, a port farther west open generally during the winter, renders possible a certain amount of traffic throughout the whole year, but even this port together with Archangel, in view of the overburdened internal transport service, can only afford facilities for a small proportion of the wheat which Russia would export in normal conditions. Mr. Broom-

hall estimates that Russia with her present facilities will be able to export only some 12,000,000 bushels, against exports which for the ten years before the war averaged 128,000,000 bushels. As Broomhall estimates that North Africa and Russia together can during 1916-17 supply some 18,500,000 bushels, and on the other hand that Greece and Serbia are needing imports of a like quantity, in the analysis which is to follow, in order to avoid burdensome particulars, no further statistical details with reference to these countries are necessary.

The importing states are United Kingdom, France, Belgium, Holland, Italy, Denmark, Sweden, Norway, Spain, Portugal, and Switzerland. The exporting countries, in the order of their exporting importance during the last two years, are Canada, United States, Argentina, Australia, and India.

Requirements of Importing Countries.—Dealing with totals only data concerning the 11 importing countries follow:

	1916-17	1915-16	1914-15	Five Year's Average, 1909-13
Production	1,000 Bus.	1,000 Bus.	1,000 Bus.	1,000 Bus.
Imports	645,029	669,007	674,964	735,849
Total Supply	460,000	478,086	439,840	427,985
	1,105,029	1,147,093	1,114,804	1,163,834

The requirements (estimated imports) for 1916-17 were thus estimated several months ago by Mr. Broomhall, who more recently expressed the opinion that they should be reduced 10% owing to the British order requiring the milling of 81% of flour from the wheat and to the lessened consumption arising from high prices. By a recent order the rate has been raised to 85% for France. Allowing the estimated requirements to stand at 460,000,000 bushels, the total supply of these countries shows for 1916 a drop of 42,000,000 bushels as compared with 1915, and a drop of 59,000,000 bushels as compared with the five-year average. There seems therefore substantial reason to doubt whether the actual imports will fall short of 460,000,000 bushels unless the wheat is not available for shipment or is shipped and does not reach its destination. The requirements of France placed at 310,000,000 bushels compare with 326,000,000 and 345,000,000 in the immediately preceding years and

361,000,000 in the five-year average. Owing to the conditions more recently reported in France her requirements from abroad will be in the future still greater.

Mr. Broomhall estimates the requirements outside of Europe at 40,000,000 as compared with 56,000,000 actually imported last year, and an import in normal times of about 98,000,000 bushels. This is certainly a low estimate which lack of shipping, the scarcity of supply, and the submarine menace may justify.

SUPPLIES FROM THE EXPORTING COUNTRIES.

The following table will give an idea of the export situation, the data for carry-over being taken from official sources for Canada and the United States and from those furnished by Mr. Broomhall and Sir James Wilson for the other countries. The facts more recently disclosed would indicate some changes in carry-over:

COUNTRIES	1916-17				
	Carry-over August 1, 1916	Production, 1916	Total Production and Carry-over	Estimated Exports, 1916-17	Left for Consumption and Carry-over, August 1, 1917
	1,000 of Bus.	1,000 of Bus.	1,000 of Bus.	1,000 of Bus.	1,000 of Bus.
United States	150,000	639,886	789,886	175,000	614,886
Canada	50,000	220,367	270,367	180,000	90,367
Argentina	32,000	70,225	102,225	20,000	82,225
Australia	53,000	152,090	205,090	70,000	135,090
India	44,000	318,000	362,000	44,000	318,000
	329,000	1,400,568	1,729,568	489,000	1,240,568

The totals in the foregoing table compare as follows for the same countries with the previous years and the five-year average; omitting carry-over for preceding years:

	1916-17	1915-16	1914-15	Five-Year Average 1909-13
Production	1,000 Bus. 1,400,568	1,000 Bus. 2,144,932	1,000 Bus. 1,557,375	1,000 Bus. 1,482,608
Exports.	(a) 489,000	606,271	529,844	387,645
Left for consumption and carry-over	911,568	1,538,661	1,027,531	1,094,963

(a) Estimated.

The exporting countries therefore produced in 1916, 744,364,000 bushels less than in 1915, 156,807,000 less than in 1914, and 82,040,000 less than the average production of the five years 1909-13, but fortunately all these countries carried over into the new year beginning August 1, 1916, large surplus stocks. The long haul, requiring five ships to one needed on the North Atlantic route, is a great handicap to Australia and India in the marketing of their large surpluses. The same may be said of Argentina's surplus. Its new crop, officially estimated at only 70,000,000 bushels, will not more than provide for its home needs which normally are 65,000,000 bushels. Assuming that 5,000,000 bushels of this poor crop is unmerchantable, the

14,000,000 or 15,000,000 bushels which Brazil expects to import as usual would absorb practically all the surplus of the preceding year's crop that she is willing to part with. Mr. Broomhall estimates Argentina's exportable surplus at 20,000,000 bushels, whereas official estimates make it only about 8,000,000 bushels.

The conditions of short haul and shipping facilities provided with adequate protection have therefore turned the Allied Governments largely towards Canada and the United States.

In view of the stocks officially reported to exist in the United States on March 1st and in Canada on April 1st, the following analysis of the disposal of the crops in these countries will be interesting:

	UNITED STATES, Bushels	CANADA, Bushels
Exports of wheat and wheat flour to April 1st, 1917	137,000,000	116,000,000
Eight months' food requirements to April 1st	344,000,000	32,000,000
Seed for winter wheat	50,000,000	1,638,000
Total distribution to April 1st	531,000,000	149,638,000
Stocks of wheat, April 1st	250,000,000	126,000,000
Estimated disposal of these stocks.—		
Four months' food requirements	172,000,000	16,000,000
Seed for spring sowing	30,000,000	24,000,000
	202,000,000	40,000,000
	250,000,000	126,000,000
Leaving for export till, and carry-over, on August 1st	48,000,000	86,000,000
Estimated export, four months	40,000,000	65,000,000
Surplus, August 1st	8,000,000	21,000,000

The United States' grain year, however, really begins July 1st, whereas Canada's grain year begins September 1st. There would have to be deducted from the 21,000,000 bushels of Canada's surplus one month's requirements for bread, viz.: 4,000,000 bushels, then the normal export for the month of August would probably absorb nearly all of the balance of 17,000,000 bushels, leaving very little if any of the old crop to be marketed with the new.

It appears, therefore, that the exports for Canada may reach approximately 181,000,000 bushels and those of the United States 177,000,000. That is, although the

United States exports have so far run ahead of those of Canada, it is expected that with navigation now open Canada will as usual export more than double as much wheat per month as during the winter. During the last four months of last grain year Canada exported 107,000,000 bushels and the United States only 65,000,000.

A remarkable result is shown from a comparison of the total exports for Canada and the United States during the first eight months of the grain year with the total exports of the other leading countries for the same period, reported by Mr. Russell:

	Bushels
The total exports from the leading countries for this period were	335,680,000
The total exports from Canada and United States were	263,134,689
Leaving for the countries outside of Canada and the United States only.	82,545,311

It is to be noted, however, that Mr. Russell's figures just quoted refer to wheat only, whereas the official exports from Canada and the United States include both wheat and flour. Notwithstanding this fact however the shipments from other countries must be considered by the importing countries as very disappointing. Shipments at the same rate of about 10,000,000 bushels per month from the Southern Hemisphere for the remaining four months of the grain year would be for the whole year little in excess of 120,000,000 bushels. Fortunately it is estimated that both Canada and the United States will be able to spare more than the quantity originally estimated by some 60,000,000 bushels. That is, it is not at all improbable that much wheat heretofore counted as unmillable will find its way to the flour mills and be used for bread. The extreme high prices at present prevailing will undoubtedly bring to market every available bushel of wheat in the countries, leaving a very small if any surplus at all at the end of the respective grain years.

WHEAT EXPORTS OF CANADA AND UNITED STATES FOR THE GRAIN YEARS 1915-16 AND 1916-17 TO DATE (INCLUDING WHEAT FLOUR EXPRESSED AS WHEAT)

1915-16—	CANADA	UNITED STATES
August	3,149,532	20,258,000
September	7,629,162	25,864,000
October	35,144,450	23,590,000
November	47,045,176	19,143,000
December	42,524,051	20,250,000
January	8,245,626	20,743,000
February	8,309,850	20,992,000
March	10,072,595	23,964,000
April	16,216,850	22,323,000

May	34,101,415	20,508,000
June	28,049,379	12,113,000
July	28,669,653	10,422,000

Total for 1915-16.	269,157,789	240,165,000
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1916-17—

August	23,127,830	15,316,000
September	12,802,841	17,987,000
October	16,618,305	15,722,000
November	18,263,408	18,916,000
December	22,383,800	18,608,000
January	10,000,587	24,003,337
February	4,231,090	13,560,052
March	8,594,437	12,419,000

Total for 8 months	116,022,300	136,531,389
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As a matter of fact up to April 1st the actual exports from Canada and the United States had reached figures which the statistical experts had not thought probable earlier in the grain year.

This is the export situation in North America. The spirit of optimism has prevailed in the importing countries. Broomhall is the authority for the statement that at the close of 1916 the stocks in Great Britain were large enough to cover requirements running ahead from six weeks to three months, instead of for half that time as had been usual in the preceding year. As a matter of fact the world's export had been kept up pretty nearly to normal shipments of 11,000,000 bushels weekly until the 27th of January last. It can be seen from the following table from Russell's Market News of May 21st relating to wheat only that there have been some sharp fluctuations since that date but that the figures tend upward since the minimum of 5,000,000 bushels weekly were reached during the first two weeks of April.

WORLD'S WHEAT EXPORTS

THE EXPORTS FROM LEADING COUNTRIES FOR THREE YEARS AND SINCE AUGUST 1ST FOLLOW, WITH DETAILS FROM DECEMBER 9TH

	1915-16	1914-15	1913-14
YEAR	596,552,000	524,464,000	665,224,000
Week ending	1916-17	1915-16	1914-15
Dec. 9	10,392,000	11,216,000	8,648,000
" 16	8,664,000	12,104,000	12,560,000
" 23	9,592,000	9,848,000	8,016,000
" 30	10,264,000	10,280,000	8,096,000
Jan. 6	11,440,000	13,440,000	9,792,000
" 13	12,192,000	12,184,000	9,232,000
" 20	9,808,000	11,512,000	8,560,000
" 27	5,776,000	10,352,000	10,136,000
Feb. 3	9,832,000	13,048,000	13,656,000
" 10	8,688,000	11,856,000	10,608,000
" 17	8,296,000	11,000,000	12,480,000
" 24	6,832,000	13,472,000	11,656,000
Mar. 3	7,552,000	13,008,000	13,864,000
" 10	9,216,000	12,952,000	11,888,000
" 17	7,656,000	14,744,000	12,600,000
" 24	7,600,000	14,200,000	12,704,000
" 31	6,560,000	11,912,000	9,088,000
Apr. 7	5,504,000	14,120,000	11,416,000
" 14	5,480,000	12,688,000	13,112,000
" 21	6,016,000	13,584,000	14,944,000
" 28	6,452,000	11,056,000	12,672,000
May 5	7,848,000	13,440,000	11,448,000
" 12	9,128,000	13,056,000	11,512,000
" 19	7,861,000	12,168,000	13,488,000
Since August 1st	384,172,000	457,424,000	427,880,000

The total since August 1st last shows the decided falling off of 73,000,000 bushels as compared with the preceding years, and the decrease has occurred chiefly since the last week in January.

The export figures in the preceding table referring to United States and Canada show the situation up to the end of March. The Canadian exports for April are only 2,125,065 bushels of wheat and 537,728 barrels of flour. Converting the flour into an equivalent of wheat there is a total of only 4,744,841 bushels as compared with 16,000,000 shipped in April last year. The April figures for the United States are not yet available, but the March figures were only 12,419,000 bushels compared with nearly 24,000,000 shipped in March 1916.

Moreover, it seems probable from the figures published in Russell's Market News that the 200,000,000 bushels of wheat which Mr. Broomhall expected would be shipped during the grain year from the Southern Hemisphere are not forthcoming in sufficient quantity.

THE FLUCTUATION IN PRICES

There is much in the foregoing statement to explain the wide fluctuations in the price of wheat on this continent. The extremely high price reached a month ago cannot be dissociated from the real situation in relation to supply and demand. It may be that very few producers of wheat obtained the high prices, absolutely free though they were to secure them, and provided with every facility for marketing their wheat, securing loans on it, and holding it in their own or the Government terminal elevators for the highest price they believed obtainable. The fact is there has been a coincidence of extraordinary circumstances making for these extreme prices quite apart from any illegitimate speculation. During the latter months especially there were felt the results of the extraordinarily concen-

trated buying of the agents of the Allied Governments, who had to secure the wheat for loading into ships leaving port at stated dates. Competing with them were the agents of two other European groups of neutrals equally intent on securing urgently needed supplies. Then both these agencies were competing with the American millers upon whom the demand for flour at that time was exceptional. In connection with this demand it was stated at the time that there was a great deal of hoarding of flour by American families. To intensify the situation there were the legitimate traders accustomed to buy from the producers contract wheat and buying at the same time contract wheat on the speculative market, in order to hedge or protect their transactions against possible wide fluctuations of the market. This year in spring wheat territory more than one-half of the wheat was below contract grade. These traders, however, bought the farmers' non-contract grades of wheat and for protection sold speculative contract grades. The spread or margin of price between the two grades is usually pretty constant in normal times but increased abnormally during this great rise in price. When these men came to buy wheat futures to cover their speculative positions they put the prices up on themselves and on the rest of the competitors. There was no real wheat to be secured; the various agencies had bought all that was available. As a result the spread between the prices of the non-contract wheat which the traders bought from the farmers and the corresponding contract wheat which they sold speculatively was so great, increasing continually with the advance in price, that many of the traders were ruined and others saved from ruin only by the commonsense view taken by the British agents who came to their rescue in compromise settlements. With a cessation of such urgent buying prices have gradually sunk to a normal level.

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DEPARTMENT OF AGRICULTURE

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CONTENTS

	PAGE
Provincial Farm Loan Legislation.....	545
Canadian Wheats in Australia.....	546

PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
The Division of Forage Plants:	
Alfalfa in Canada, by M. O. Malte.....	547
The Late Mr. J. F. Watson.....	551
Dominion Department of Agriculture Honour Roll.....	551
The Entomological Branch:—	
The Discovery of the European Ermine Moth (<i>Yponomeuta</i>) on Nursery Stock Imported into Canada, by Dr. C. Gordon Hewitt.....	552
White Grub Investigation—A Brief Report of Progress, by Arthur Gibson.....	554
The Health of Animals Branch:—	
Anthrax, by Chas. H. Higgins.....	556
The Live Stock Branch:—	
A Market News Service, by A. P. Westervelt.....	559
The Seed Branch:—	
The Growing of Roots and Vegetables for Seed in the Province of Quebec, by J. A. Simard.....	559
The Publications Branch:—	
The Distribution Service.....	562

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Recent Agricultural Legislation:—	
Nova Scotia.....	563
Saskatchewan.....	564
Alberta.....	566
British Columbia, by W. E. Scott.....	569
The Wintering of Alfalfa:—	
Nova Scotia, by John M. Trueman.....	572
Quebec, by Leo Brown.....	572
Macdonald College, by Jas. Murray.....	573
Saskatchewan, by L. E. Kirk.....	573
British Columbia, by H. O. English.....	577
Farm Book-Keeping:—	
Quebec, by F. N. Savoie.....	578
Macdonald College, by H. Barton.....	579
Ontario, by C. F. Bailey.....	579
Saskatchewan, by Edward Oliver.....	580
Alberta, by E. S. Hopkins.....	581
British Columbia, by W. E. Scott.....	581
Demonstration Sheep Flocks:—	
Macdonald College, by A. A. MacMillan.....	582
Ontario, by R. W. Wade.....	584
Saskatchewan, by W. H. J. Tisdale.....	584
Graduates of Agricultural Colleges:—	
Nova Scotia, by M. Cumming.....	586
Macdonald College.....	586
Oka Agricultural Institute, by Bro. Jean de la Croix.....	586
Ste. Anne de la Pocatière.....	587
Ontario.....	587
Manitoba.....	587
University of Saskatchewan.....	588
Alberta Agricultural Schools.....	588
Nova Scotia:—	
Agricultural Instruction Activities, by J. G. Archibald.....	589
Dairy Competitions.....	590
Quebec:—	
The Maple Sugar and Syrup Industry, Season 1917, by F. N. Savoie.....	591
Notes of Agricultural Affairs.....	592

Ontario:—	
The Condition of Apiaries.....	593
Work of Tractors.....	593
District Representative Activities.....	594
Manitoba:—	
Condition of Bees.....	596
Demonstration Plowing Match.....	596
Further Particulars of Gopher Week.....	596
Saskatchewan:—	
Activities of the Department of Agriculture, by W. L. H. Stokes:—	
Co-Operative Trading.....	597
Testing Seed for Germination.....	597
Gopher Day.....	598
Alberta:—	
The Handling of Manure on the Demonstration Farms, by S. G. Carlyle.....	598
A Returned Soldiers' Agricultural Course.....	599

PART III RURAL SCIENCE

Summer Schools for Teachers:—	
Prince Edward Island, by W. J. Reid	601
Nova Scotia.....	601
New Brunswick	602
Quebec:	
Macdonald College	602
Ontario.....	603
Saskatchewan.....	603
Alberta	604
British Columbia	604
The Package Library:—	
Nova Scotia, by M. Cumming.....	605
Macdonald Institute, Guelph, by Miss M. U. Watson	605
Manitoba, by Mary G. Wood	606
The Inspector and Rural Science, by J. H. Hunter	608
New Brunswick:—	
Vacation Care of School Gardens.....	610
A Bird House Fair	610
Saskatchewan:—	
School Fair and Teachers' Convention	611
Rural School Lunches, by Miss F. A. Twiss	611

PART IV SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Modern Pasteurisation at Low Temperature, by J. Vanderleck	614
Boards of Trade and Agriculture	620
Associations and Societies.....	621
New Publications	621
Notes.....	623
Index to Periodical Literature	624

PART V THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence.....	625
Science and Practice of Agriculture	625
Crops and Cultivation	626
Live Stock and Breeding.....	627
Farm Engineering	628
Agricultural Industries	629
Plant Diseases	632
Injurious Insects.....	632
Agricultural Economics:—	
Co-Operative Dairies in New Zealand.....	633
Profitable Trading for Country Girls in the United States	634
Agricultural Statistics:—	
Foreign Crop Conditions.....	636
The Course of the Prices of Wheat after the War.....	638
Wheat Prospects After the War.....	638
Cabled Crop Report.....	641

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OF CANADA

VOL. IV

JULY, 1917

No. 7

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PROVINCIAL FARM LOAN LEGISLATION

A marked feature of the legislation of the provinces this year has been the various Farm Loan Acts that have been passed by the legislatures of Ontario and the Prairie Provinces. Although the direction of all the measures is the same, in each case there has been adopted a different method, so far at least as the details are concerned, of attaining the desired goal. While the provinces referred to have particularized this year in this manner, Quebec for some time has had a system in the Caisse Populaire or People's Credit Bank, and British Columbia has The Agricultural Act, 1915, tending towards the fulfilment of the same object. The Quebec system was described in THE AGRICULTURAL GAZETTE, Volume 1, page 358, and again in Vol. II, page 481. The British Columbia Act was fully summarized in Vol. II, page 458.

The Ontario Farm Loans Act is to be operated through the municipal corporations of the province, who can borrow from the Provincial Treasurer such sums as are required. Not more than half of the amount loaned can be used for other purposes than permanent improvements and the loan must not exceed 60 per cent of the assessed value of the land, while the rate of interest is definitely settled at 5 per cent.

The Manitoba Farm Loans Act creates a Farm Loans Association with a capital of a million dollars divided into 200,000 shares of \$5 each, of which the province takes half and advances further a sum equal to the remainder of the paid-up capital. The rate of interest is to meet the rate of interest on the securities, plus one per cent to cover expenses. No loan is to exceed 50 per cent of the value of the property involved and not to be for more than \$10,000.

The Saskatchewan Act provides for the appointment of a Board of Administration to consist of a salaried Commissioner and two members to be paid per diem expenses. As in Manitoba, the loan is not to exceed 50 per cent of the valuation of the property offered as security, but the Board is to settle the rate of interest. The Provincial Treasurer, for the purposes of the Act, is authorized to raise a loan of \$5,000,000.

The Alberta Act provides for a board of three or five members, one of

whom is to be a commissioner. Mortgages must be for a term of 30 years, the principal to be repaid by annual instalments at a rate of interest sufficient to meet all costs. Loans must not exceed 40 per cent of the value of the land and not to be for more than \$5,000 to any individual borrower. The outstanding securities must not exceed \$10,000,000.

The foregoing outlines in terse form both the principles and points of divergence of the different measures; but the Farm Loan Acts do not embody the only methods by which all the four provinces responsible for them propose that farmers shall be able to raise needed money. Manitoba has adopted a Rural Credits Act through which Rural Credit societies can borrow money from the banks at 6 per cent and let it out on crops, live stock and ma-

chinery at 7 per cent, and also an Act authorizing municipalities to raise funds for seed-grain purposes at 6 per cent. Saskatchewan has amended the Live Stock Purchase and Sale Act of the province so that credit can be extended to returned soldiers up to 90 per cent of the value of the animals at stake. Alberta has passed a Live Stock Encouragement Act through the instrumentality of which loans on live stock can be secured not exceeding \$500, and bearing 6 per cent interest. The most westerly of the Prairie Provinces has also adopted an Act for loans on seed-grain account.

The Ontario and Manitoba Acts here referred to were outlined in THE AGRICULTURAL GAZETTE for June. Those of Saskatchewan and Alberta are similarly treated in this month's issue.

CANADIAN WHEATS IN AUSTRALIA

THE Honourable Minister of Agriculture of Canada recently received a letter from Sir Joseph Carruthers, of the Legislative Council, Sydney, New South Wales, in which reference is made to the remarkable success of some Canadian wheats, which were sent to him for test on his estate at Snowy River, at an elevation of 3,500 feet, where late and early frosts occur.

The following passage from the letter is of particular interest as showing that some of the varieties of wheat introduced by the Dominion Cerealists, may prove of a great value in other countries than Canada:

I had secured Marquis seed 3 years before through our State Department of Agriculture. I was, therefore, able to compare your Marquis seed with my own growing. I found that the grain you sent to me was plumper, more even and a uniform dark red. However, after growing side by side in 1916 the resulting crop from

each was the same, but your seed was purer. Last year from my crop I distributed Marquis wheat very largely in New South Wales, and also to a small extent in Queensland, Victoria and South Australia.

The results have been wonderfully successful. Yields up to 42 bushels to the acre have been harvested and the average is over 32 bushels. My own crops average about 38 bushels.

In this season rust has been most prevalent and wind-storms and phenomenal rains laid the bulk of the crops down, yet Marquis has been almost free from rust and has stood up to both rain and wind so that it has beaten all others when grown side by side with them.

Huron wheat was grown from your seed for the first time in 1915-16 and I was able then to distribute 6 lots as well as to sow about 10 acres myself. The results have been splendid and the yields quite as good as Marquis, the crops being free from rust and standing up well. The grain is splendid and shows no sign of deterioration from the fine sample you sent me.

This year I am distributing to about 50 farmers and I anticipate there will be 500 acres under Huron and 5,000 acres under Marquis in the coming season.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF FORAGE PLANTS

ALFALFA IN CANADA

BY M. O. MALTE, Ph.D., DOMINION AGROSTOLOGIST

IT is gratifying to learn, from reports received from the Superintendents of the branch farms and stations of the Experimental Farms system, that the alfalfa outlook for the season is in general very good. The reports do not only predict a crop of high value to the dairy men and "mixed farmers" in general, but also indicate that alfalfa has conquered a position in Canadian agriculture entitling it to the most sincere consideration of every farmer in the country.

Indeed, alfalfa has conquered Canada. Only a few years ago it was considered a crop out of reliable reach of the ordinary farmer in most parts of the Dominion, a crop that had to be nursed most carefully along to return the yields heralded by enthusiasts. Today, alfalfa is grown successfully in almost all the provinces of the Dominion. It is grown to the greatest advantage in the valleys of British Columbia, on the plains of the Prairie Provinces, and on the farms of Ontario and Western Quebec. In the East it must be confessed success has not been met with universally. Certain conditions of the soil, especially in

Eastern Quebec and New Brunswick, have so far seemed to be adverse to successful alfalfa growing. It should be remembered, however, that alfalfa growing in the Maritime Provinces is still in its infancy and, consequently, the lack of success, so far experienced, must not be considered a definite proof of the impossibility of growing alfalfa successfully there.

VARIETIES

Since the introduction of alfalfa into Canada a great number of varieties have been tested. During the course of the experiments it was learned that the value of a variety depends in the first place on its ability to withstand the rigours of the Canadian winter, i.e., to come through without being winter-killed. A great many "varieties", particularly those originated in southern countries with mild winters, have proven unreliable, and experiments with them have, therefore, been dropped. The only variety of true alfalfa that has proven suitable to Canada in general is Turkestan alfalfa. It is grown at present at the Experimental Farm, Brandon, Man.,

the Experimental Station, Scott, Sask., the Experimental Station, Lacombe, Alta., and the Experimental Station, Summerland, B.C. On all these stations it came through last winter very satisfactorily.

Perhaps the most widely known alfalfa varieties in Canada are those which can be termed "Variegated Alfalfa", so called on account of the variation in the colour of the flowers. Whereas a variety of true alfalfa has purple flowers, a variety of the variegated type has them variously coloured, from yellow to purple with

made this spring on some of the Experimental Farms and Stations indicate that best results in alfalfa growing depend to quite an extent on the preparation of the soil previous to seeding.

The Experimental Station, Scott, Sask., reports: "Last season a nine-acre field of alfalfa was sown in May. A part of this field had grown potatoes in 1915, a part field roots, another part fodder corn and the balance field peas. The alfalfa is more vigorous on the potato and corn land, and less vigorous after peas".



ALFALFA AT THE EXPERIMENTAL STATION, LENNOXVILLE, QUE.

all kinds of intermediates. The variegated alfalfas are all crosses between true Alfalfa (*Medicago sativa* L.) and Yellow Lucern, (*Medicago falcata* L.), and are of particular interest because of their high degree of hardiness. Among the variegated alfalfas the following are best known in Canada, viz.: *Grimm's*, *Ontario Variegated*, *Baltic* and *Liscomb*. They are all much alike in general appearance and may be equally well recommended for Canada in general.

CULTURAL CONDITIONS AFFECTING ALFALFA GROWING

Preparation of the soil previous to seeding.—A number of observations

Similar results have been obtained by the Experimental Station, Kentville, N.S., and the Experimental Farm, Agassiz, B.C., which report that best results of alfalfa are realized on land previously in hoed crops. That a hoed crop is apt to have a beneficial effect on the conditions of the soil for alfalfa is obvious. Not only is the land after a hoed crop cleaner than after other crops, but the subsoil is also apt to be more loosened up. That the opening up of the subsoil is of importance for a good start of alfalfa is emphasized in the report given by the Experimental Station, Sidney, B.C. This report states that blasting of the subsoil previous to seeding to alfalfa

has a most favourable effect on the ensuing crop.

Fall ploughing of the land intended for alfalfa is universally to be recommended, whether the previous crop is a hoed crop or grain. It is also essential to work the land well in the spring. At the Experimental Station, Lacombe, Alta., "thorough spring cultivation has been given on fall-ploughed stubble, with the result that by the middle of May land was in first class condition for seeding, both as to the condition of the soil and because of the fact that several

live stock of any kind be allowed to graze on an alfalfa field the season it is sown.

In case of old and well-established fields it is generally advisable not to graze or cut too late in the fall, but leave a certain amount of growth standing. Thus the Experimental Station at Sidney, B.C., where four growths of alfalfa generally are obtained in a season, recommends that the fourth growth be left standing for winter-protection. The Experimental Farm, Agassiz, B.C., and the Experimental Station, Charlotte-



STACKING ALFALFA IN THE LETHBRIDGE DISTRICT, ALBERTA

crops of weeds had germinated and been destroyed". The Experimental Station at Charlottetown, P.E.I., also reports that "the land should be cleaned of weeds, and given thorough cultivation until it is worked into good tilth for seeding".

Treatment late in the autumn.—Alfalfa sown in the spring should be given every chance to establish itself firmly before the frost. It should be clipped frequently during the summer with the last clipping so timed as to allow the plants to reach a height of about 8 or 10 inches at the end of the growing season. This growth should be left untouched for winter protection. Never should

town, P.E.I., also recommend that grazing or cutting too late in the fall be avoided. On the other hand, the Experimental Station, Invermere, B.C., reports that "In some cases alfalfa in this district has been allowed to stand after the second cutting, but more generally has been pastured until late in the autumn, with no apparent injury to the plant."

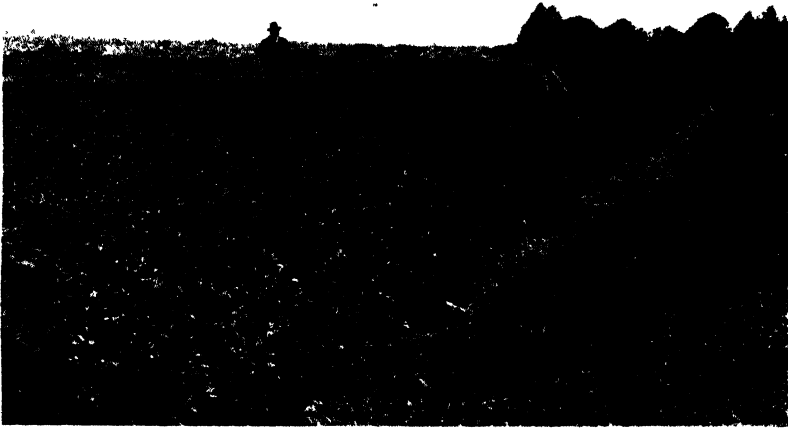
The relationship of inoculation to the establishment of satisfactory stand and vigour of crop.—It is a very common misapprehension that alfalfa cannot be grown satisfactorily without inoculation on land that has not grown alfalfa or sweet clover before. Numerous data have been collected

during the past few years showing that the value of inoculation has been greatly over-estimated. A few extracts may be quoted from reports obtained this spring.

The Experimental Station, Summerland, B.C., reports: "The alfalfa that was seeded on newly-broke sagebrush land for testing inoculated seed and seed that had not been treated, showed that the plants grown from the inoculated seed were a better colour the first crop after seeding, but at the second cutting no difference could be observed. Nodules

difference can be noted in the inoculation experiments, although both the soil and culture methods of inoculation are being tested."

From the above extracts, as well as from numerous other observations it may be gathered that it is by no means necessary to inoculate alfalfa. However, inoculation is beneficial in-as-much as it helps to give the young crop a good start. This is of special importance in those parts of Canada where the winters are trying and where it for this reason is essential that a healthy, vigorous growth



ALFALFA AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA, JUNE 9TH, 1917

were formed on both stands at the same time". The Experimental Station at Sidney, B.C., says, that "Inoculated plots are quickly established and greater vigour of growth is obtained during the first two years." That the difference which might be observed between inoculated and non-inoculated alfalfa fields will disappear after some time has been especially noticed at the Experimental Station, Scott, Sask., where "At the time of writing no

be established at the end of the first growing season. The more vigorous the growth is and the healthier the young crop is at the end of the first year, the greater are its chances for successful wintering. In this way "inoculation for alfalfa", as the Experimental Station, Lacombe, Alta., states, "is necessary not so much as a guarantee of securing a satisfactory stand but as a guarantee of vigour and permanence of the crop."

THE LATE MR. J. F. WATSON

MR. J. F. Watson, Chief of the Division of Extension and Publicity of the Experimental Farms Branch, died at his home in Ottawa on May 12th, at the age of forty-six years. The late Mr. Watson, who was born in England, joined the staff of the Experimental

Farms in the Division of Horticulture in 1893. When the Division of Extension and Publicity was formed three years ago Mr. Watson was placed in charge. For eighteen years Mr. Watson was secretary-treasurer of the Ottawa Horticultural Society.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE
WHO HAVE ENLISTED FOR OVERSEAS SERVICE

OUTSIDE SERVICE

G. S. Hanmore, V.S., Toronto.
W. B. Price, V.S., Carstairs, Alberta.
A. Martin, Summerland, B.C.
J. S. Chivers, Invermere, B.C.
R. W. Cornish, Invermere, B.C.

CASUALTIES

D. Joudoin (killed in action), Ottawa.
W. J. Withrow (died), Ottawa.

Canada has officially and unofficially set her teeth to the job of seeing the war through to the limit of her resources. She has set us many shining examples that deserve earnest imitation. She has held staunchly to the conclusion for three years that food will win this war for the democratic peoples of the world. With a population less than that of the state of Pennsylvania, Canada has made a record that will live as long as American history is read.—*Barton W. Currie, in The Country Gentleman.*

THE ENTOMOLOGICAL BRANCH

THE DISCOVERY OF THE EUROPEAN ERMINE MOTH (*YPONOMEUTA*) ON NURSERY STOCK IMPORTED INTO CANADA

BY C. GORDON HEWITT, D.Sc., DOMINION ENTOMOLOGIST

SINCE the discovery of the ermine moths *Yponomeuta malinellus* and *Y. padellus* in the state of New York a few years ago on nursery stock imported from France, a careful watch has been maintained by those officers of the Entomological Branch engaged in the inspection of shipments of foreign nursery stock for the appearance of these insects. The illustrations shown herewith of the early stages in which the insects are liable to be carried on nursery stock were sent to the inspectors as it is sometimes difficult to detect the small egg clusters under which the young hibernating caterpillars are found on the dormant nursery stock.

No shipments of European nursery stock infested with this insect had been found in Canada until May 8th, 1917, when a shipment of ornamental shrubs and fruit seedlings imported into the St. John Valley, N.B., from Mr. Chas. Detriche of Angers, France, was found to be infested with *Yponomeuta* and it was necessary to destroy about 450 apple seedlings out of a total of 20,000. The packing materials and the cases were destroyed, and the remainder of the fruit stock contained in the shipment was dipped in lime-sulphur (1-10) and placed under quarantine for further inspection. Great credit is due to our officers, Messrs. L. S. McLaine and A. B. Baird of the Entomological Laboratory, Fredericton, N.B., who were responsible for this discovery and for the subsequent eradication measures.

On account of this discovery the apple and cherry ermine moths were

scheduled under the Destructive Insect and Pest Act by the following Order-in-Council, passed on May 15th, 1917:—

His Excellency the Governor General in Council, on the recommendation of the Minister of Agriculture and under and in virtue of the provisions of "THE DESTRUCTIVE INSECT AND PEST ACT", is pleased to order that the General Regulations approved under date of the 4th November, 1914, and amendments thereto, shall be and the same are hereby further amended by adding to Regulation X, Part (a) Insects and Pests, the following:

"The apple and cherry ermine moths".
"*Yponomeuta malinellus* and *Yponomeuta padellus*".

IMPORTANCE OF ERMINE MOTHS IN EUROPE

In Europe the ermine moths are regarded as being among the most destructive of orchard pests. *Yponomeuta padellus* is very destructive to hawthorns and plums, and in England I have frequently seen hedges completely defoliated by the larvæ of this insect. In England *Y. malinellus* is an important pest of apple; sometimes whole orchards are defoliated and the crops in such orchards are seriously reduced for several years. An injurious outbreak of *Y. malinellus* occurred in Germany in 1910. In Sweden, and especially in Russia, the ermine moth is regarded as one of the most important insects attacking apple trees. According to Schreiner the annual loss to the apple crop in the government of Saratov alone approximates three million marks.

All European accounts of orchard pests give very considerable promi-



EGG CLUSTER NATURAL SIZE



*PORTION OF EGG CLUSTER
GREATLY ENLARGED*



EGG CLUSTER ENLARGED



*LARVAE HIBERNATING
UNDER EGG-MASS*



EGG CLUSTER ENLARGED

*APPLE ERMINE MOTH
YPONOMEUTA MALINELLUS*

*EARLY STAGES LIABLE TO BE
CARRIED ON EUROPEAN NURSERY
STOCK*

*PHOTOS BY P.J. PARROT
N.Y. AG. EXP. STA., TECH. BULL. 24*

nence to the ermine moths on account of their economic importance. It is necessary therefore that the exercise of the greatest vigilance shall be continued with a view to preventing the introduction of these insects into Canada. The importance of such watchfulness will be readily understood in view of the grave results that followed the introduction of the brown-tail and gipsy moths into this continent. There is little doubt that the ermine moths would be able to survive and flourish under Canadian conditions in view of their widespread occurrence in Russia and Sweden.

ORIGIN OF INFESTATION AND HABITS OF INSECT

The adult moths usually fly during July and August, and as they are often common pests in the neighbourhood of the nurseries in France they readily visit the blocks of growing nursery stock and deposit their eggs on the young one-year-old seedlings. The eggs are deposited in small oval clusters on the bark near a bud. The egg masses have the appearance of small gray scales. In the autumn the eggs hatch and the young caterpillars spend the winter underneath the scaly covering formed by the egg masses. It is in this condition that they are transported from one country to another on the dormant nursery stock. On the infested nursery stock that our

officers recently found in New Brunswick large numbers of the young caterpillars were found alive under the shelter of the egg scars. These would have emerged to feed upon the leaves during the present spring.

In feeding the young caterpillars display a gregarious habit somewhat like that of our native tent-caterpillar or fall web-worm and form grayish silken webs into which they draw the leaves. These webs are gradually extended to bring in new leaves upon which the caterpillars feed. When the foliage on one branch is destroyed they migrate *en masse* to another and in this way ultimately defoliate the entire tree. When they are full grown the caterpillars spin their cocoons in contact with each other in their silken tent, and as many as 1,500 cocoons placed side by side have been found in a single tent.

The adult insects are small moths measuring about four-fifths of an inch (20 mm.) across the wings. The fore-wings are white bearing black dots, hence the popular name of ermine moth. The hind-wings are grey and broadly fringed. The caterpillars are about three-fifths of an inch (15 mm.) long and vary in colour from pale to grayish or greenish brown.

Specimens of any insects answering to the above descriptions that may be found in or near nurseries should be submitted immediately to us for examination.

WHITE GRUB INVESTIGATION—A BRIEF REPORT OF PROGRESS

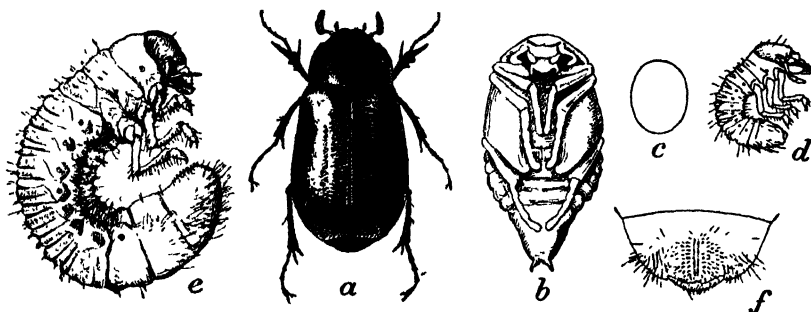
BY ARTHUR GIBSON, CHIEF ASSISTANT ENTOMOLOGIST, IN CHARGE OF FIELD CROP INSECT INVESTIGATIONS

WHITE Grubs, which are the larvæ of the May Beetles, or June Bugs, are well known objects to the farmer, owing to the serious damage they effect to the roots of grasses, corn, etc., and to the tubers of potatoes. Fortunately, white grubs are not present in num-

bers every year to cause widespread injury. This is accounted for by the fact that a period of several years is necessary to complete the life-cycle of the insect, the destructive species in Canada requiring at least three years to develop from the time the egg is laid until the adult insect

appears in the beetle state. In years when the beetles are present in large numbers much injury takes place to the foliage of oak, willow, poplar, linden, elm, and other trees.

made in various localities and observations noted in the autumn of 1916, we were able to predict important flights of the beetles in 1917. During the end of May and in June



THE VARIOUS STAGES OF THE MAY BEETLE, OR JUNE BUG

a, beetle; b, pupa; c, egg; d, newly hatched grub; e, full grown white grub; f, anal segment of same from below. a, b, e enlarged one-fourth; c, d more enlarged. (After Chittenden, U. S. Bureau of Entomology, Bull. 19, N.S.)

The importance of definite knowledge of the life-history, habits, control, etc., has long been felt, but it has only been of recent years that the Entomological Branch has been able to undertake such investigations. As briefly announced by Dr. Hewitt in his report as Dominion Entomologist for the year ending March 31st, 1914, white grub studies were undertaken in 1913 in co-operation with the United States Bureau of Entomology.

At the Treesbank Entomological Laboratory, in Manitoba, *Lachnosterna rugosa*, *L. dubia*, *L. grandis* and *L. nitida* have been studied and at the Ontario Field Laboratories, at Strathroy and Ottawa, observations have and are being made on the life-histories of *L. fusca*, *L. dubia*, *L. rugosa*, *L. grandis* and *L. gibbosa*. From such investigations we are accumulating much information of value, not only with regard to the life-histories of the insects, but also on their feeding habits, etc.

During the year 1916 the white grubs which caused widespread injury in 1915, matured in early summer and changed to the beetle state in August. In this condition they remained in the soil throughout the winter of 1916-1917, and from collections of grubs

of the present year such flights occurred in eastern Canada. Undoubtedly conspicuous numbers of the beetles would have appeared earlier in the latter half of May had the weather been of more normal temperature. Collections of the beetles made at various points have been received. In central and eastern Ontario *Lachnosterna fusca* and *L. dubia* were particularly abundant. These collections are of special value as not only do they add to our knowledge of the distribution of the various species but we expect to rear from them specimens of the important parasitic insects which lay their eggs upon the beetles when they are feeding or resting at night.

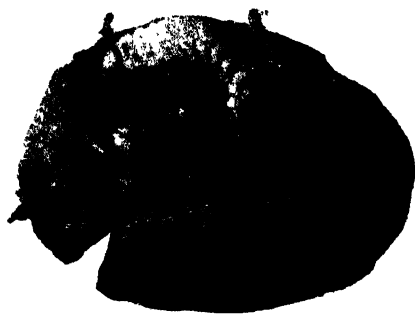


FIG. 2. TUBER OF POTATO DESTROYED BY WHITE GRUB
(Original)

The present year has also been an excellent one for beginning life-history studies from beetles collected in copula and confined in specially prepared breeding cages. The female beetle enters the earth to deposit her eggs, each one of which is laid separately and surrounded by an earthen cell, the earth being kept together by a glutinous fluid secreted by the female. A female will lay as many as 50 eggs or even more. The young grubs hatching from these eggs will not effect serious injury to crops in 1917, but in 1918 when they will be larger and more voracious, important losses will undoubtedly occur in districts where the beetles

were abundant. In many fields in such districts it will be unsafe to grow such crops as potatoes, corn or strawberries in 1918. Infested land, so far as is possible should be used for a small grain or clover crop. Crops such as potatoes, corn, etc., grown in wide rows, should be planted on ground clean cultivated the previous year. Badly infested fields may be used in 1918 for such crops as alfalfa, peas or buckwheat, but should not be used for potatoes and corn as above mentioned. If it is not desirable to use infested land for alfalfa, peas or buckwheat, the same may be again planted to timothy or small grain.

THE HEALTH OF ANIMALS BRANCH

ANTHRAX

BY CHAS. H. HIGGINS, PATHOLOGIST

ANTHRAX is a highly infectious disease of animals that is contracted by the introduction of infected matter beneath the skin (blood or tissue from an animal dead of the disease, earth or any other material containing living anthrax organisms). So serious is the infection considered that it is mentioned as one of the scheduled diseases under "The Animals Contagious Diseases Act." It may affect all warm-blooded animals, and men frequently contract anthrax and die as a result of the infection.

Anthrax is most frequently seen in cattle, sheep, horses and hogs. It may occur at any season of the year, but especially in the summer or fall. Outbreaks are often associated with tanneries. Tanneries may have hides in process of manufacture from animals dead of the disease, and the anthrax organisms being removed in the "soak" water in turn infect the river or creek into which the "soak" water is discharged, as well as any low lying land which such water may overflow.

CAUSE

The anthrax organism was one of the first to receive attention, owing to the fact that its relatively large size permitted it to be seen in the blood with the microscopes used in the early sixties of the last century. Before this, while the disease was diagnosed, the germ causing it could not be identified, as the available microscopes did not magnify sufficiently. We owe Pasteur, the French chemist, whose researches on various phases of fermentation paved the way for a fuller understanding of diseases and their causes, a lasting debt of gratitude for giving us much information which to-day is common knowledge regarding anthrax.

Anthrax is caused by a rod-shaped bacillus, organism or germ, which multiplies with great rapidity in the blood. It has the power when drying of transforming itself into a resting stage or "spore" and this "spore" is capable of withstanding high temperatures and other untoward conditions which would des-

troy the life of the anthrax germ if it were not in the spore form. It is this resting or spore stage that makes it so difficult to effectively deal with an outbreak. Stables, yards and even the soil become impregnated with the virus or germ and their effective disinfection proves a somewhat difficult matter. In dealing with an outbreak the Department takes into consideration the various factors involved, treating each in such a manner as to safeguard the interests of all concerned.

DIAGNOSIS

The diagnosis of anthrax is not a difficult matter to one trained in bacteriological science, as an examination of the blood of a dead animal almost instantly reveals the cause. To the lay person the sudden onset of the disease and the rapid course, followed by death should arouse suspicion. When suspicious, the fear of anthrax should be communicated to the nearest veterinary inspector, whose training will permit him to accurately judge the nature of the malady from which the beast died. He will also determine the steps that must be taken to prevent its further spread. When anthrax is suspected, the skinning of the carcass must not be undertaken, as such a procedure liberates the germs which would otherwise be almost completely destroyed by its decomposition. Such carcasses should be burned immediately, but when this is impossible, deep burial in quicklime must be practised.

OCCURRENCE

Outbreaks of anthrax have occurred in various parts of Canada, probably the most serious being the one at Swift Current, Sask., in 1901, when the sheep of the Canada Land and Ranch Company were very seriously affected. At this time some thirty thousand sheep were exposed, of which three thousand died. Three

human beings were affected, but fortunately as a result of prompt treatment recovered. Three horses died of the disease, but no cattle were affected. An area approximately seventy-five by twenty-five miles in this district along Swift Current Creek was infected. The outbreak was brought under control as a result of the sanitary precautions inaugurated by Dr. J. C. Hargrave, of Medicine Hat, and the writer. Vaccine was used as an additional precaution on a large number of the sheep. No record of a recurrence has been reported in this locality since that time.

The diagnosis was confirmed by laboratory methods and animal inoculations. The source of the infection was not definitely established in this instance, but circumstantial evidence indicated that it was brought by sheep shearers direct from the Argentine Republic in South America.

In the fall of 1916 an outbreak occurred at Oshawa, Ontario, where some twenty-five head of cattle and one horse died of the disease. The history here indicated that isolated deaths had been caused by the disease in previous years but were incorrectly diagnosed, and at no time was anthrax suspected. A number of men contracted the disease and in March, 1917, one death in man was recorded, this being the first human case in this locality where the diagnosis was confirmed by microscopic examination. The banks of the creek into which the wash and other waste water from a tannery were discharged were found to be infected with anthrax.

Small outbreaks are frequently reported and are promptly dealt with by this Branch each year. It has been the policy for many years to recommend the vaccination of animals on infected premises. When this procedure has been effectively carried out untoward results from anthrax infection are rarely experienced.

ANTHRAX VACCINE

As we recommend the use of anthrax vaccine where anthrax has occurred, a short description will doubtless prove interesting.

Anthrax vaccines are attenuated or weakened cultures of the germ, causing anthrax (*bacillus anthracis*). The process of attenuating or reducing the strength of the germ is confined to the laboratory and cannot with safety be conducted elsewhere.

Anthrax vaccines properly used, afford protection, resistance or immunity to a subsequent artificial or natural anthrax infection.

To protect or immunize an animal against anthrax, two vaccines are required and protection or immunity is the result of the animal passing through two mild, properly graded attacks of the disease, which, as a rule, cause no inconvenience to the patient save a slight elevation in temperature. During these two mild attacks of the disease it is advisable to take particular care of the animals, avoiding exposure to inclement weather and extremes of heat or cold.

Vaccine used on an animal already affected with anthrax will not protect such an animal, nor will it prevent its death. The use of anthrax vaccine, during or immediately after the occurrence of an outbreak of anthrax, may be followed by death in some instances due to the stimulation of the anthrax germs already in the system of the animal. Such accidents cannot be prevented. In the use of anthrax vaccine the temperature of the animal to be vaccinated should be taken immediately before inoculating, and, in the event

of the temperature being elevated, vaccination should be deferred until the temperature of the animal is again normal.

It is possible to establish immunity or resistance to anthrax very rapidly and also to remove some of the dangers attending vaccination through the use of a serum-vaccine. The serum-vaccine treatment of animals consists in the injection of a protective serum on one side of the neck of the animal to be treated, and immediately thereafter inject the vaccine on the other side of the neck. This establishes an effective protection or immunity in about ten days, overcomes the second handling of the animals to be protected, and the vaccine itself is safer to use. The protective serum if used during an outbreak on animals actually diseased, or such as have a high temperature, will assist them in overcoming the infection and may prevent deaths from anthrax.

In cases of human anthrax, experience has shown that this serum gives the greatest hope of success when used as soon as the infection is suspected. A number of recoveries have been attributed to the use of this serum.

All animals that are to be quartered on premises known to be infected with anthrax should be vaccinated at least once a year, otherwise there is danger of their contracting this disease.

A special bulletin giving a full description of anthrax is available for distribution and will be forwarded on application to the Veterinary Director General, at Ottawa.

THE LIVE STOCK BRANCH

A MARKET NEWS SERVICE

BY A. P. WESTERVELT, CHIEF, MARKETS INTELLIGENCE DIVISION

A weekly market news service in connection with the Markets Policy of the Dominion Live Stock Branch, has been inaugurated under the direction of the Hon. Martin Burrell, Minister of Agriculture.

The service is intended to provide an authentic and continuous source of information on all phases of the marketing of live stock, poultry and poultry products, such that those concerned with the production and distribution of these commodities may operate in a more intelligent manner than would otherwise be possible. The information on which the reports are based is strictly independent in its origin, being obtained through officers of the Live Stock Branch who are devoting their whole time to the work. The value of the information should be greatly enhanced as a result.

The Markets Intelligence Division of the Live Stock Branch is responsible for the reports relative to live stock, while the Poultry Division of the Branch is in charge of poultry information, both reports being mailed for service at the earliest possible hour after the week's information is in the hands of the editing staffs of the Branch.

The medium of distribution is the agricultural press of Canada, which is co-operating with the Department in this respect. It is intended that the information shall cover a considerably larger field than is now shown in the reports. This will include reports on live stock operation throughout Canada and such general information as may be gathered that will assist in a better understanding of conditions on both the home and foreign markets.

THE SEED BRANCH

THE GROWING OF ROOTS AND VEGETABLES FOR SEED IN THE PROVINCE OF QUEBEC

BY J. A. SIMARD, B.S.A., DISTRICT SEED INSPECTOR FOR QUEBEC

SO many articles have been published in agricultural periodicals, and even in daily newspapers, showing the reasons for which the growing of roots and vegetables for seed should be encouraged, and recommending suitable methods of growing, that the writer will present only a brief summary of the endeavours made with this aim in view in the province of Quebec since the beginning of the war, the results

obtained and the prospects for the future.

It should be stated, however, that the present situation had been foreseen by the Dominion Seed Commissioner, who showed, after investigation, that 75 to 90 per cent of the vegetable seed came from Europe, and that it was urgent, as had been shown in his circular-letter of October 3rd, 1914, to set to work at once, in order to prevent, if possible,

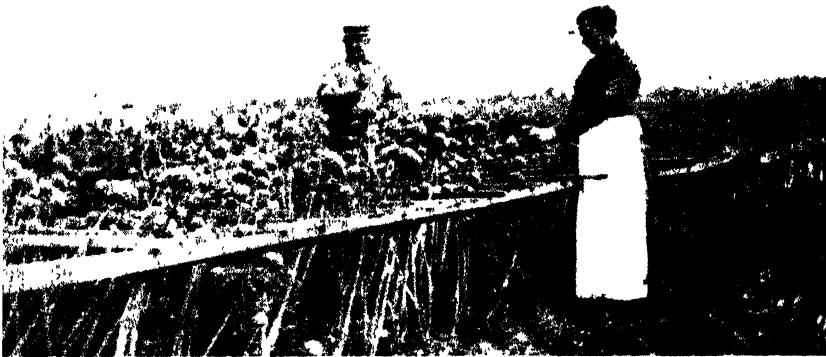
a deficiency in the supplies of these seeds, on which depends a very important branch of our agriculture.

As early as the autumn of 1914, market gardeners of Quebec and Montreal, the big farming establishments and the most prominent farmers of the province, were visited and acquainted with the situation, and instructions were given on the spot, on the selection of roots and vegetables for plantation, in view of seed production, as well as on the storing of these vegetables and roots; such instructions were given to all those who expressed a desire to try to produce these seeds on their own farm.

had been done under good conditions.

All these crops were inspected during the fall, and instructions were given on the harvesting of the crop, which was of splendid quality, as shown by later reports. Of the three hundred farmers visited in 1914-15, two hundred and fifty harvested a sufficient quantity of seed for their own use and sixteen a sufficient quantity to receive the Government grant.

In 1915-16, one hundred and twenty-five new farms were visited. The results of the inspection made the previous fall showed that more than



FIELD OF WETHERSFIELD ONION SEED AT CHARLESBOURG, QUEBEC, 1916

Although started late in the season, this work gave excellent results. A great number of farmers were visited; all of them understood the necessity of local production of seed and promised to plant the following spring a number of seed plants, proportionate to the quantity they had in stock and that would keep in good condition.

Enquiries made in the spring of 1915 showed that the majority of these farmers had succeeded in keeping in good shape a large part of the vegetables and roots selected the preceding fall, and that the planting

four hundred farmers harvested seed from carrots, beets and swedes for their own needs, and that several were able to sell seed to their neighbours. The number of those who secured the grant last year was about the same as in 1915, but as a rule the quantity of seed harvested was larger. There were, moreover, twenty-five farmers in the counties of L'Assomption and Joliette who used last year seed of registered swedes and beets which had been supplied by Macdonald College through the kindness of Mr. P. Boving. The seed plants obtained

from these seeds were planted this spring and there is every reason to believe that splendid results will be obtained.

However, it should be stated that it has been a hard matter, so far, to persuade farmers to grow vegetables for the production of seed for the trade. The development of this industry has not been as rapid as might have been desired, on account of the low prices offered by seedsmen for these products and of the purity required for various varieties, not mentioning the difficulties of cleaning. However, the scarcity of seeds, and the continual increase in value of these products, attract the attention of several farmers who gradually increase their plantations, and who will, doubtless, give more time to this branch of farming when they are convinced that it is profitable.

Last year, most of the beginners sowed seed which they had harvested on their own farm, and they were greatly astonished at the results obtained, the germination being much better than that of the seed which they were accustomed to purchase, specially as regards swedes, the seed of which, harvested in this country, germinated at the rate of 100 per cent. This result has greatly encouraged beginners and has shown the fallacy of the claim that it is impossible to produce this seed in our district, owing to the rigour of the climate and the shortness of the season. Farmers have observed that their seeds are much cleaner, purer and stronger, than those they used to buy, as they were often deceived by seedsmen. Frequently they asked for some specified variety and, through a mistake or otherwise, they received a variety quite different. Most of these difficulties will disappear when we harvest our own seed, thus having a guarantee of the value of our products.

As an instance of the above mentioned facts, it might be stated that the mistake is often made of selling

rape seed for swede seed, owing to the fact that both kinds are so similar that they can easily be mistaken the one for the other. Many complaints are made to us on this point every year. It will be easy for the farmers to avoid these difficulties by harvesting their own rape seed, which may be produced in Quebec, not only for the needs of the district, but also in sufficient quantities for the needs of other provinces.

This is, moreover, the opinion of Mr. Paul Wattier, of Côte des Neiges, Montreal, an expert in the matter, who has harvested for a great many years all the seed which he requires and who stated that this is the only way of securing good results in the growing of vegetables.

As regards the growing of swedes for the production of seed, it is likely that this industry will take a great development in the province of Quebec, where products of superior quality are now being harvested. For instance, the swedes of Ste-Foy have no equal and always command the highest prices on the Montreal market. If the farmers of Ste-Foy could be induced to sell seed for the trade, they could sell it under a special brand and thus secure larger profits.

Among other fine results obtained during the year in seed production, the cases can be mentioned of Mr. Alex. Morrison, of Ste-Therese de Blainville, near Montreal, who harvested an acre of Danver carrot seed of excellent quality, and of Mr. J. J. Villeneuve, of Charlesbourg, who during the last three years has harvested splendid seeds of swedes, onions and beets.

It is known that seed of carrots, swedes, onions and tomatoes may be successfully grown in the districts of Montreal and Quebec and in the Eastern Townships. Swede seed may be grown all over the province, except perhaps in the extreme eastern counties.

To sum up, it must be recognized that the growing of vegetables and

roots for seed production in the province is no longer in the experimental stage, that the results so far obtained show that this industry presents no special difficulties, and that it can be conducted so as to bring considerable profit. The soil is suitable in most of the agricultural

districts and our farmers can display sufficient care to make a success of the same, and they have enough practical sense to understand that no more favourable opportunity could be had of establishing this industry on a paying and permanent basis.

THE PUBLICATIONS BRANCH

THE DISTRIBUTION SERVICE

WHEN speaking in the House of Commons on the work of the Department of Agriculture, the Honourable Martin Burrell, Minister of this Department, made the following statement with respect to the operations of the Publications Branch:—

The Publications Branch as it stands at present is a connecting link between the Department of Agriculture and the public. By its operations the agricultural community and all interested are provided with the annual and other reports of the several branches, as well as with the pamphlets, booklets, circulars, leaflets, and similar publications issued under the auspices of the Department. During the past few years, the system of distribution has been improved and the volume of circulation much increased. Up to 1912 each branch of the Agricultural Department issued its own publications and paid for them—ran its own show, as it were. These have all been consolidated now under a special branch, the Publications Branch. The lists at the time the present system was organized, were small and much of the addressing was done by hand. These lists, involving Branch and Division lists numbering twenty-seven, included about 150,000 English and French names. The lists have been since that consolidated, reclassified and developed until upwards of 306,000 people are receiving our bulletins, and are directly reached by the information afforded by investigation, research and study at the experimental farms and the live stock, dairy and other branches. The classifications now include subdivisions so arranged that the applicants

are sent publications on the subjects desired and only these.

There is no use in sending them to anyone who will destroy them or not put them to good use. Under a system of combinations, it is arranged that when a publication, such as Seasonable Hints, including information on several branches of agriculture, is sent to all the mailing lists, one copy only is addressed to one person. The lists are maintained on metal stencils from which envelopes are addressed by machinery that handles 20,000 to 25,000 addresses per day. Great progress has been made in reaching the farmers of the country. Application cards showing the subjects embraced by the several mailing lists are sent to the farmers on rural routes and made available to visitors at fairs and exhibitions. These cards are mailed also to those who apply for publications and who are not already on the lists. From these sources many applications are received and classified as required. The following table indicates the growth of the lists and shows the number of publications mailed during each of the five past fiscal years:

Year	No. on Lists	No. of Publi- cations	No. Mailed
1913	168,292	48	1,450,000
1914	178,000	59	1,069,483
1915	202,000	46	1,806,454
1916	240,000	66	3,091,435
1917	306,200	62	3,306,718

Total in 5 years 10,724,040

In addition to the publications that are sent out as I have stated, special publications are sent to those who ask for them.

PART II

Provincial Departments of Agriculture

RECENT AGRICULTURAL LEGISLATION

NOVA SCOTIA

A number of bills relating to agriculture were passed at the recent session of the Nova Scotia Legislature. One of these is designed to give specific financial aid to the further development of dairying; another is to help in the erection of Roller Process Wheat Mills, and a third to aid in the purchase of such power agricultural machinery as clover-hullers and ditching machines required for the development of agriculture in the province generally. The first of these provides for an expenditure not exceeding \$20,000, towards the building and equipment, with necessary plants and machinery, etc., of demonstration creameries or cheese factories, and, in addition, makes provision for the paying of running expenses of such demonstration creameries or cheese factories. The Government is now operating two creameries in parts of Cape Breton where a sparse population and lack of development of dairy farming made it difficult for a private creamery to be a paying proposition. The Government agreement is to operate these two creameries, as well as one or two more that may be erected, until such time as they become "going concerns," when they are to be purchased by the farmers of the communities in which they are erected, and to be operated as co-operative creameries.

The third measure spoken of empowers the Government to spend a sum not exceeding \$3,000 in any one year for the purpose of assisting a municipality, agricultural society, or persons to purchase power clover-hullers, power ditching machines, or similar agricultural machinery. This bill resulted from the successful demonstration given of the possibility of clover seed growing in Nova Scotia that was promoted by the provincial Department of Agriculture operating a power clover-huller in several districts. Last year in the province, where practically no clover seed had previously been threshed, the Government thresher handled 15,000 lb. of clover seed.

AMENDING BILLS

Several amending bills were passed. One amended the "Act for the Encouragement of Agriculture" by providing that "Within a district in which an agricultural society has been formed, and is in operation, or within a district in which a Live Stock Improvement Association has been formed, and is in operation under any statute of Canada, no unregistered bull shall be offered for public service." Any person offering an unregistered bull for service, in contravention of this Act is liable to a fine of \$20. This measure was passed to meet the views of the three hundred agricultural societies and

stock improvement associations in the province.

The Stallion Enrolment Act was amended by providing that no charge for the services of any stallion not enrolled under the provisions of the Act shall be recoverable at law.

The Nova Scotia Farmers' Association was first organized in 1893. Since that time considerable legislation pertaining to the powers of this Association, and making provisions for delegates, etc., has been passed. At the session of 1917 all this legislation was consolidated with one amendment to the effect that no county association may send more than four delegates to the annual Farmers' Association meeting.

A bill for the protection of blueberries in the province decrees that no person shall pick or rake from the bushes any blue-berries by means of any scoop or other mechanical device, or otherwise than by hand.

APPROPRIATIONS FOR AGRICULTURE

The following are the estimates for the Department of Agriculture, province of Nova Scotia, for the year 1916-17:—

Salaries and expenses of officials Department of Agriculture.....	\$13,250.00
Agricultural College and Farm.....	34,000.00
Assistance to Dairying.....	3,500.00
Entomological Investigation.....	4,000.00
Drainage.....	200.00
Exhibitions.....	10,000.00
Field Crop Competitions.....	1,000.00
Model Orchards.....	500.00
Printing and advertising.....	600.00
Agricultural Societies.....	15,000.00
Provincial and County Farmers' Associations.....	1,450.00
Stallion Enrolment.....	500.00
Assistance to Poultry.....	800.00
For subsidizing and erecting Cereal Mills.....	20,000.00
For erecting Creameries.....	20,000.00
For subsidizing power Clover Hullers, etc.....	3,000.00
Miscellaneous.....	400.00
Total.....	\$128,200.00

SASKATCHEWAN

AMONG the bills passed at the recent session of the Saskatchewan Legislature were the Saskatchewan Farm Loans Act, an Act to incorporate The Saskatchewan Co-operative Creameries, Limited, and an Act to amend an Act respecting Seed Grain, Fodder and other Relief. A number of amendments to existing Acts were made through the Statute Law Amendment Act, 1917. The Municipalities Seed Grain Act was amended so as to limit municipalities to an advancement of seed grain not exceeding \$250 in respect to any one quarter section. The Noxious Weeds Act was amended to provide that on the order of an inspector an owner or occupant shall destroy Canada thistle or perennial sow thistle in any growing crop, and, with the consent of the councillor for the division, may be required to cut and burn, or

plough under, such crop or any specified part thereof within a stated time. Inspectors are also to make a weekly return to the Department of Agriculture and to the municipality of the notices served by him. The Live Stock Purchase and Sale Act was amended so as to include a provision that credit to the extent of 90 per cent of the value of the animals supplied may be extended to any man who has served overseas in the Canadian Expeditionary Force since August, 1914. The Stray Animals Act was amended principally to provide for its enforcement by the Saskatchewan Provincial Police in succession to The Royal Northwest Mounted Police.

THE SASKATCHEWAN FARM LOANS ACT

The principal measure passed affecting the agricultural interests of the province was The Saskatchewan

Farm Loans Act. This Act establishes a board consisting of a Commissioner and two other members, with headquarters at Regina and to lend money to agriculturists on the security of first mortgage on farm lands and to do all things necessary or incidental to the business of lending money on farm property. Unless removed for cause, the Commissioner is to hold office for ten years. The other members receive no salary, but a per diem allowance when on duty. Loans, which can only be made on a first mortgage, must be expended on improvement or development of the property, or to meet liabilities previously incurred for those purposes, or, with the approval of the board, for the acquisition of land. No loan must exceed 50 per cent of the board's valuation of the property offered as security. Loans are repayable by annual instalments. The rate of interest is to be fixed by the board. In order to provide the funds for the working of the Act, the Provincial Treasurer is authorized to raise a loan on the credit of the province not in excess of \$5,000,000. The total amount of securities issued by the province for the purpose of the Act must not exceed the aggregate amount of the mortgages held by the board. Mortgages are to be hypothecated to the Provincial Treasurer as security for the advances to the board. Reports must be prepared annually and be ready for consideration by the legislature within fifteen days from the commencement of the session. The Act came into force on the first day of May this year.

THE CO-OPERATIVE CREAMERIES ACT

The Act incorporating The Saskatchewan Co-operative Creameries, Limited, unites the Moosomin Butter and Cheese Manufacturing Association and fifteen creamery companies in different parts of the province. The head office of the company is at Regina and the capital stock is

\$500,000 divided into fifty thousand shares of one dollar each and 22,500 shares of twenty dollars each. No person can hold more than fifty shares of the twenty-dollar stock or more than one thousand shares of the one-dollar stock. Transfers must be sanctioned by the directors. Three directors were to be chosen to hold office for one year, two for two years and two for three years. Thereafter directors, of whom there were 15 provisionally nominated, appointed to vacancies are to serve three years. The Lieutenant-Governor in Council can authorize the Provincial Treasurer to enter into contracts with the company for the construction, equipment and maintenance of public cold storage warehouses suitable for the preservation of food stuffs. The Lieutenant-Governor in Council can also authorize a loan on any warehouse equal to 75 per cent of the appraised value thereof, such loans to be repaid in twenty equal annual instalments with 6 per cent interest. The aggregate amount of such loans unpaid must not at any time exceed \$75,000. The Provincial Minister of Agriculture can appoint inspectors and the Lieutenant-Governor in Council can make regulations, the violation of which brings liability to a fine not exceeding \$50. The Lieutenant-Governor in Council can authorize the Provincial Treasurer in the event of certain localities of the province being colonised by returned soldiers, and upon application for the establishment of a local creamery being signed by such residents, to loan to the company a sum equal to the cost of any creamery, cheese factory or other building required for the purpose. The company can establish what the Act terms "locals" at any point, but only with the sanction of the Lieutenant-Governor in Council. The company must not pay a dividend of more than ten per cent on the paid-up capital. If any surplus remain after payment of the dividend, 50 per cent can be divided among the

patrons and the balance placed to a reserve account to be used by the company as required, and to be replaced within two months of the close of the fiscal year, which happens on the 31st October.

AMENDMENT ACTS

An Act to amend an Act respecting Seed Grain, Fodder and other Relief better defines the system of registration.

A new Municipal Hail Insurance Act was passed that in its main principle coincides with the old Act, under which municipalities can co-operate to provide compensation for hail losses. The changes deal with the method of government. The

Hail Insurance Association is formed of representatives of the municipalities which enter the scheme by a majority vote of the ratepayers. On the petition of 25 ratepayers a by-law must be submitted for the purpose by any municipality. Each municipality is entitled to a representative in the Association. Nine directors have to be elected who are authorized to arrange the indemnity, rate of assessment, and transact other business necessary for proper management.

APPROPRIATIONS FOR AGRICULTURE

Following are the appropriations for the years ending April 30th, 1917 and 1918:—

	1916-17	1917-18
Civil Government.....	40,975 00	34,830. 00
Assistance to General Agricultural Interests	67,600.00	67,600. 00
Assistance to Live Stock Industry.....	44,800. 00	32,700. 00
Assistance to Dairy and Poultry Industry	71,100 00	16,300 00
Publicity and Statistical Work.....	26,900 00	21,600 00
Weed Control, Seed Inspection and Exhibitions.	8,900 00	10,400. 00
Bureau of Labour.....	9,600.00	10,100. 00
Game Protection and Museum.....	10,100 00	11,200 00
Administration of the Agricultural Aids Act.	89,000 00	330,000. 00
Miscellaneous Services.....	9,100 00	1,100 00
Totals	\$378,075 00	\$535,830. 00

ESTIMATED REVENUE, 1917-18

Game and other fees.....	\$37,000
Under the Agricultural Aids Act	330,000

ALBERTA

AMONG the half dozen measures relating to agriculture passed at the last session of the Alberta Legislature and assented to on April 5th, 1917, were three of an especially fiducial nature. The first is The Alberta Farm Loans Act, which, for the purpose of carrying out its provisions, creates a board to consist of not less than three, not more than five, persons to be known as directors and as The Alberta Farm Loans Board. Their remuneration is to be fixed and their tenure of office to be decided by the Lieutenant-Governor in Council. No person can

be a member of the board who is an officer or director of any corporation, association or partnership engaged directly or indirectly in the business of making land mortgage loans. A Commissioner of Farm Loans is provided for, to be appointed by the Lieutenant-Governor in Council, but to be paid by the board. The Commissioner must devote his whole time to the duties of the office and must be put under bond. The head office of the board is at Edmonton. Branch offices can be appointed at any place that the Lieutenant-Governor in Council may determine. The finan-

cial year ends on the 31st December and the annual statement must be forthcoming as soon as possible and be submitted to the legislature within fifteen days after the commencement of the session. Loans can only be made on first mortgages and on farm lands in the province of Alberta free from all prior liens and encumbrances. Each mortgage is to be for a period of thirty years and the loans are repayable in equal instalments on the first day of January in each year. The rate of interest must be sufficient to meet all expenses. Loans must not be granted for an amount exceeding forty per cent of the appraised value of the land offered as security for the loan and must not be in excess of \$5,000 to any one person. While loans can be made in instalments to meet the cost of improvements as they are made, such advances must not exceed a proportional amount to be reckoned according to the value of the work done. The loans can be used for acquiring land for agricultural purposes, for purchasing machinery and equipment, for the erection of buildings and making improvements, for discharging liabilities and for any purpose which in the opinion of the board will increase the productiveness and usefulness of the land. A mortgagor can pay off his mortgage in full after the expiration of one year from the date of same upon the payment of six months' interest by way of bonus, or after five years without bonus, or he can after that time pay an additional \$25 or any multiple of \$25. The working capital of the board is such moneys as may be raised by the issue of bonds under the Act and such moneys as may be provided by the legislature. The sum of \$10,000 was forthwith provided by the Act for expenses of the board and the Lieutenant-Governor in Council was authorized to advance any other sums necessary for giving effect to the Act. Power is given to raise money on bonds to be known as "Alberta Farm Loan Bonds."

Such bonds must not be issued for a term exceeding fifty years and the rate of interest must be fixed by the Lieutenant-Governor in Council. The net amount of securities outstanding at any one time must not be in excess of \$10,000,000.

LIVE STOCK ENCOURAGEMENT ACT

The second measure of the fiducial nature referred to passed at the recent legislative session is to be known as "The Live Stock Encouragement Act." Under this Act any association can apply to the Provincial Live Stock Commissioner or Acting Commissioner or any Assistant Commissioner for a loan wherewith to purchase cows and heifers, but the amount loaned to any single purchaser must not exceed \$500. On consent of the Commissioner not more than ten per cent of the amount can be used towards purchasing a pure-bred bull. Notes of members of the Association are to be given for the loans bearing interest at 6 per cent per annum and a fee of \$1 for each \$100 is to be paid to meet expenses. All transactions must be conducted with the consent of the Commissioner. Loans must not cover a period of more than five years. Default in payment, or neglect of the stock, justifies seizure and resale of any of the stock of the purchaser. No execution, distraint, attachment or garnishee can stand against the live stock purchased under the terms of the Act until the loan is settled.

THE SEED GRAIN ACT

The third measure of the nature described is cited as The Seed Grain Act, 1917. The Provincial Treasurer is authorized to guarantee advancements for the purchase of seed grain to the extent of \$75,000. Applications for advancements must be made in set form to the Minister of Agriculture. The loans can be covered either by notes or chattel mortgage. There is also to be a lien or charge upon all grain grown upon the land

for which any seed grain or money has been advanced under the Act. If any grain grown upon the land is sold it is recoverable. The Provincial Treasurer can at any time declare any security given under the Act immediately due and payable, other than a promissory note. Both owner and occupant are required to sign the note and lien. Any person making use of the advance, or the seed, for other purpose than that for which it is granted is liable on conviction to a fine of not less than \$50, not more than \$250 and costs, and in default of payment to imprisonment for not less than one month or more than six months. The Act came into force on February 1st.

An Act to Amend the Act respecting Seed Grain, Fodder and other Relief is for the better regulation of mortgages, liens or other registered encumbrances.

STALLION ENROLMENT ACT

The Stallion Enrolment Act passed at the recent session repeals the Horse Breeders' Ordinance, 1903, and amendments thereto. A board of inspection is constituted, consisting of the Provincial Veterinarian, one nominee of the Alberta Horse Breeders' Association and one nominee of the Alberta Provincial Horse Breeders' Association. Two members form a quorum. No stallion can travel in the province without having been enrolled. If pure-bred the pedigree must be given. Full particulars must be given at time of inspection—to which every stallion standing for service must be submitted—of breeding and freedom from disease, hereditary or otherwise. Certificates must be renewed every first day of January and on any change of ownership. They can also be cancelled by the Minister of Agriculture at any time. Inspectors are to be appointed who are to report their findings to the board. All stallions are subject to inspection for

the breeding season commencing with the year 1918, and every three years thereafter, until nine years of age, unless evidence has been received at the Department that an enrolled horse has become unsound. In the latter case an official examination may be made and the previously issued certificate cancelled. The fees are: \$5 for inspection, \$2 for certificate, \$1 for duplicate certificate, \$1 for transfer and \$1 for renewal. Certificates of registration issued by the Canadian National Live Stock Records Board or by any foreign society recognized by that Board will be accepted as to breeding, or any other document the Enrolment Board may deem sufficient evidence of breeding and ownership. In the case of grade stallions, the owner is to give such information under oath as he can relative to breeding. In case of death, or removal of a stallion to a point outside the province, notice must at once be given to the board. A copy of the certificate of enrolment must be given in every printed advertisement of a stallion. The Minister of Agriculture can make any rules and regulations for carrying out the Act that he thinks fit. Violations of the Act entail a liability to a fine of not less than \$25, not more than \$100 and costs, or, in default of payment, to not more than one month's imprisonment. The owner of a stallion, on payment of a fee of ten cents, can, within twelve months, file with the registrar of the district a description of the mare served, the name and address of the owner of the mare and the amount of the service fee, if unpaid. This gives a lien upon the produce of the service prior to any other claim. If the service fee is not paid before the first of May following the birth of the colt or filly the same can be seized and, on ten days' notice being given, can be sold by public auction. The Act comes into force on the first day of January, 1918.

APPROPRIATIONS FOR AGRICULTURE

The following appropriations were passed for the work of the Department in the year ending March 31st, 1918:—

Civil Government.....	\$ 54,940.00
Expenditure under Agriculture, Society Ordinance, including grants to Exhibition Associations at Edmonton and Calgary of \$5,000 each	100,000.00
Expenses of Official Judges at Agricultural Exhibitions.....	7,000.00
To promote the work of Live Stock and Agricultural Institutes and Short Course Schools.....	16,000.00
To promote and encourage the production of Pure Seed Grain, and Provincial Seed Fair.....	4,500.00
Administration of Demonstration Farms.....	18,500.00
To provide for holding a Fat Stock Show.....	2,500.00
Purchase and Equipment of Demonstration Farms.....	*7,000.00
Destruction of Grey or Timber Wolves and Coyotes.....	5,000.00
Destruction of Noxious Weeds.....	25,000.00
Stock Inspection.....	10,000.00
Expenditure in connection with Brands and publication of Official Brand Book.....	10,000.00
Collection and compilation of Vital Statistics.....	12,000.00
Collection and compilation of Medical, Agricultural, Industrial and other Statistics.....	3,500.00
To Provide for expenses in connection with the Protection of Game.....	30,000.00
To Promote and encourage Dairy Work.....	15,000.00
Operation of Demonstration Farms.....	40,000.00
Operation of Schools of Agriculture.....	20,000.00
Miscellaneous Grants.....	13,100.00
To assist Creameries, not exceeding \$1,500 to each Creamery.....	*4,500.00
Expenditure under Prairie Fires Ordinance.....	2,500.00
Expenditure for Immigration, Colonization and Advertising.....	20,000.00
Contingencies.....	1,000.00
To Promote and Encourage the Poultry Industry.....	8,500.00
To Procure Mounted Specimens of Animals, Birds, etc., for Decorative and Museum Purposes.....	500.00
To provide for Scholarships for Students attending Agricultural Colleges.....	200.00
To provide for Advances under Elevator Act.....	*200,000.00
Women's Institutes, and Grants to same.....	5,000.00
To provide for Advance Payments and General Operating Expenses of Creamery Work.....	300,000.00
Total.....	\$936,240.00

*Chargeable to Capital Account.

ESTIMATED REVENUE, 1917-18

Fees: Game Licenses, Sale of Estray Animals and other Fees.....	\$ 35,000.00
Repayment, Account of Seed Grain.....	3,000.00
Repayment, Loans to Creameries.....	2,500.00
Demonstration Farms.....	35,000.00
Poultry Breeding Plant.....	1,800.00
Registration of Threshing Machines.....	3,000.00
Brands.....	20,000.00
Stock Inspection.....	15,000.00
Reimbursement of Advance on Butter and Poultry.....	300,000.00
Total.....	\$415,300.00

BRITISH COLUMBIA

BY W. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE, VICTORIA

THE following bills dealing with agricultural matters were passed at the recent session of the Provincial Legislature:—

1. *Agricultural Act, 1915, Amendment Act, 1917.*—This Act comes into force on proclamation of the Lieutenant-Governor. It will be-

come effective concurrently with an Act to promote agricultural production, or what is known as the Land Settlement and Development Act. In this amendment to the Agricultural Act of 1915, various improvements have been made, which will tend towards more effective workings, and to the benefit of agriculturists. The amendments deal with:—

(1) The payment of a per capita grant to Farmers' Institutes, in accordance with their membership fee.

(2) Places Women's Institutes on the same status as Farmers' Institutes.

(3) Makes provisions for the formation of District Institutes.

(4) Arranges for the appointment of an Advisory Board, to be composed of members nominated by District Institutes.

(5) Provides for the supplying of stumping powder to Farmers' Institutes on the consignment plan, to be repaid by them as sales to Institute members are effected.

The other amendments deal with matters affecting the administration of the work of farmers' co-operative organizations inaugurated under the Act.

2. Land Settlement and Development Act.—The object of this Act is to increase land settlement and agricultural production throughout the province. It provides:—

(1) For the appointment of a Land Settlement Board to consist of five members, to be appointed by the Lieutenant-Governor in Council.

(2) Arrangements are made for the payment of moneys required for the purposes of the Land Settlement Board, out of the Consolidated Revenue Funds of the province, as may be directed by the Lieutenant-Governor in Council.

(3) For making agricultural loans to farmers and farmers' co-operative associations, for settlement and land development purposes,

(a) Long dated for periods to be determined by the Board, at either 25, 20 or 15 years.

(b) Short dated loans for periods to be determined by the Board, not less than three years and not to exceed ten years.

(4) The Land Settlement Board is given

power, with the sanction of the Lieutenant-Governor in Council, to take over from the Crown and to purchase from or obtain by exchange with private owners, lands within the province for agricultural purposes, and to improve and develop such lands for any land settlement purpose.

(5) Provision is made for co-operative land settlement.

(6) Special concessions are given to returned soldiers in connection with land settlement.

3. Contagious Diseases (Animals) Act Amendment Act 1917.—The object of these amendments to the Contagious Diseases (Animals) Act, is to ensure to the public a pure milk supply. By means of this Act, a more equitable grading of dairy premises and milk houses will be effected. The Act provides:—

(1) That all persons dealing in milk, cream, or the products of either, shall obtain a certificate showing the class of stables, dairy premises, etc., from which such milk is obtained.

(2) The Act makes it a penal offence to treat cattle with the object of preventing reaction to the tuberculin test.

4. Animals Act Amendment Act, 1917.—This amendment Act to the Animals Act, provides that it shall not be lawful to allow bulls over six months old to run at large from the first day of December to the first day of July, east of the Cascade Mountains, except in such districts as the Lieutenant-Governor in Council may from time to time define. The Act also provides that any owner of cows which are over two years of age, and running at large upon any unenclosed pasture or range lands east of the Cascade Mountains, shall with every thirty or major fraction thereof of such cows, provide and run therewith one bull of a good beef type. Such bull shall be upwards of one year of age.

5. Egg Marks Act 1916, Amendment Act 1917.—This Act provides that any constable or officer of any Provincial or Municipal Police Force in the province, any health officer within the meaning of Section 2 of

the Health Act, and any official appointed by the Minister of Agriculture as Inspector for the purpose of this Act, may be Inspectors under the Act.

Other minor amendments deal with the definition of cold storage and preserved eggs.

6. *Brand Act*.—This Act repeals the Brand Act, being Chapter 9 of the Statutes of B.C., 1914. The Act provides:—

(1) For the appointment of a Recorder of Brands.

(2) For the appointment of a Board of Brand Commissioners, to consist of three persons to advise and co-operate with the Recorder of Brands, with reference to the administration of the Act.

(3) For the keeping of a registry of brands and sale marks, which shall at all convenient times be open to the inspection of the public.

(4) That the person in charge of stock in transit shall have in his possession the brand certificate of the owner of the stock, or a declaration made by the owner, stating the kind and number of the stock, and the registered brands and registered sale mark of the owner of such stock. An exception is made in the case of stock at large, or stock being driven from and to points and places both west of the Cascade Mountains.

(5) The Act provides for the inspection of hides and carcasses, but does not apply in the case of dealers west of the Cascade Mountains.

(6) Regulations are laid down which

must be observed in the case of persons not being licensed under any statute or under any by-law of any municipal corporation to carry on the business of dealers in cattle. This part of the Act only applies to sections of the province as may be prescribed by the Lieutenant-Governor in Council.

(7) Provision is made for a full record to be kept of all cattle slaughtered.

(8) All dealers in hides must be licensed.

7. *Sheep Protection Act*.—This Act was passed in order to give sheep raisers in the province adequate protection from the ravages of dogs. The Lieutenant-Governor may proclaim sheep districts in any part of the province. In districts so proclaimed all dogs must be licensed and tagged, the licenses to be issued by the Superintendent of provincial police. All dogs which are not licensed and tagged may be killed by any person at any time. In sheep protection districts, no dogs shall be allowed to be at large at any time between sunset and sunrise, unless accompanied by or being within reasonable call of the owner or some person having the charge or care thereof.

APPROPRIATIONS FOR AGRICULTURE

The following appropriations for agriculture were passed for the year ending 31st March, 1918:—

Civil Government.....	\$ 65,720.00
Administration, Temporary, Employment and Outside Service, Destruction of Noxious Weeds, Departmental Exhibits and Miscellaneous Expenditure.....	18,000.00
Board of Horticulture—expenses of members attending meetings.....	500.00
Compensation to owners of cattle slaughtered for tuberculosis.....	20,000.00
Fruit Packing Schools.....	1,500.00
Agricultural Associations.....	20,000.00
B. C. Bee-keepers' Association.....	250.00
B. C. Dairymen's Association.....	1,500.00
B. C. Entomological Society.....	250.00
B. C. Fruit Growers' Association.....	3,000.00
B. C. Goat Breeders' Association.....	250.00
B. C. Poultry Association.....	1,500.00
B. C. Stock-breeders' Association.....	1,500.00
Flockmasters' Association.....	500.00
Farmers' Institutes (including educational work).....	15,000.00
Women's Institutes (including educational work).....	7,500.00
Inspection of Nursery-stock, trees, plants, etc.....	9,000.00
Suppression of Diseases affecting fruits, vegetables, plants, etc.....	20,000.00
Operating Dry Farming Experimental Plots.....	2,000.00
Travelling expenses of officers on duty.....	20,000.00
Total	\$207,970.00

THE WINTERING OF ALFALFA

NOVA SCOTIA

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE

WE have had only a small plot of alfalfa at the Nova Scotia Agricultural College. It was seeded in 1914 and did well in 1915, but had become weedy in 1916. This spring so many grasses had come up in the plot that we decided to plough it up and re-sow. The alfalfa seemed to have wintered well, and was in good condition wherever the grass had not crowded it out. The seed we used was Ontario Variegated. One row of Grimm's that had been kept cultivated is in good condition, not having been injured by the hard frosts of the past winter.

We prepared the soil for seeding

by ploughing early in the spring and harrowing at frequent intervals until the middle of July, when the seed was put in without a nurse crop, and had made a very fine luxuriant growth by the middle of September. This plot was not cut the first fall and came on well in the spring. Two cuttings seem to be all we can hope to get in Nova Scotia, one in early fall and a second in August. If the alfalfa is cut a third time in September it leaves the ground too bare to stand the hard frosts of winter. We find that inoculation of the seed is practically essential to secure a good stand.

QUEBEC

BY LEO BROWN, AGRICULTURAL INSTRUCTOR

THE editor of THE AGRICULTURAL GAZETTE sends a list of questions on experiments made on the growing of alfalfa in the province of Quebec. The answers had to be postponed owing to the fact that the season being very late, it was impossible to find out in what condition the alfalfa had come through the winter.

(1) How did alfalfa plantations generally come through the winter?

The new sowings came through in splendid condition; alfalfa fields two or three years old were not so good.

(2) What varieties present the most vigorous appearance?

In our experiments, the varieties Grimm and Liscomb gave the best results.

(3) What conditions of culture are shown to be most favourable?

The use of a cover crop (barley) has facilitated the catch of alfalfa.

(4) Preparation of the soil previous to seeding?

The alfalfa was sown in sandy soils very deep, drained naturally, and exempt from weeds.

(5) Treatment of the plots or fields late in the autumn?

A good aftergrowth was left on the fields and covered with small shrubs, so as to keep the snow, and prevent it from being swept away by the winds.

(6) The relationship of inoculation to the establishment of satisfactory stand and vigour of crop?

Alfalfa was sown in fields where a fairly large quantity of clover had been growing. There was no need, therefore, to inoculate the soil.

MACDONALD COLLEGE

BY JAMES MURRAY, B.S.A., PROFESSOR OF CEREAL HUSBANDRY

THE past year was not a favourable one to test the comparative hardiness of varieties and strains of alfalfa, inasmuch as all of our strains wintered equally well. In winters like that of 1916-17, when a good covering of snow protects the plants from November until April, we do not expect to lose by winter killing any great percentage of even tender strains of alfalfa. Such winters, however, are the exception. In normal years we find most of the ordinary commercial varieties badly thinned out and many of the so-called hardy strains killed to a limited extent. In extremely hard seasons very few varieties are able to withstand the conditions. In the latter class Grimm alfalfa stands out as the one best suited to such conditions as obtain in eastern Ontario and Quebec. Other good varieties are Baltic and Ontario Variegated. These so closely resemble Grimm in appearance and habit of growth that it is impossible to distinguish them with certainty, but our experiments here have shown that Grimm is nearly always the heaviest yielder. This variety has repeatedly withstood winter conditions that were fatal to both red clover and alsike. In spite of the high price that one must pay for seed of the Grimm, its record is such that it must be recommended above

all other varieties at present on the market.

From the result of experiments carried on in the Cereal Husbandry Department and from observing the behaviour of many plots in at least half a dozen counties in Western Quebec we are convinced that the successful growing of alfalfa in this region depends upon observance of the following points:—

1. Land must be well drained either naturally or artificially. Good surface drainage is just as essential as good underdrainage.
2. It is usually necessary to apply lime in some form as most Quebec soils give an acid reaction.
3. Only the hardiest varieties will withstand our severe winters. Grimm is the best. Other suitable sorts are: Baltic and Ontario Variegated.
4. Only land free from grass and perennial weeds will give a satisfactory crop.
5. Late fall cutting or close fall pasturing will probably not kill hardy strains but will materially reduce the crop of the following year.
6. Satisfactory stands may be secured either with or without a nurse crop. When a nurse crop is sown use only about one bushel of barley per acre and sow about twenty pounds of alfalfa seed; when no nurse crop is used do not sow until about the first of July and use about fifteen pounds of seed.
7. Good stands of alfalfa well cared for will produce profitable crops for at least four years.

SASKATCHEWAN

BY L. E. KIRK, B.A., B.S.A., INSTRUCTOR IN FORAGE CROPS, UNIVERSITY OF SASKATCHEWAN

THE winter of 1916-17 was a particularly severe one on alfalfa. Not for a number of years have the experimental plots passed through such an ordeal or sustained as great a set back. In every case the "physically unfit" were discovered and eliminated with ruthless impartiality. Such a testing

while working disaster with the trim appearance of our fields affords unparalleled opportunities for eliminating the non-hardy strains and selecting those which are constitutionally fitted to meet the rigorous requirements imposed by our North-western climate.

In 1916, sixty-four samples of seed

were received from the United States Department of Agriculture in accordance with an arrangement for the co-operative testing of different varieties in the North-west. These were planted in rows two hundred links long and five links apart. Among them were many interesting and promising introductions, including twenty-seven samples of Med. Falcata from different localities in Russia, Siberia, Turkestan, and Northern India. They also included seventeen Sativas besides samples of Grimm, Cossack, Liscomb, Turkestan, Peruvian and Mongolian alfalfas.

RECORD OF PLANTINGS

Practically all of them made a vigorous growth in 1916 and went into the winter in a healthy condition. The following table indicates the fall and spring stands with percentage survival of plants. The relative vigour of the plants is expressed by the symbols A, A—, B+, B, B—, etc., and comparison is made with the check rows of Grimm which easily establishes a standard of excellence. The relative hardiness of the falcatas is worthy of note, as is also the low survival percentage of Sativa and total loss of alfalfas from warm climes:

TABLE I—BEHAVIOUR OF ALFALFA PLANTINGS AT SASKATOON IN THE SPRING OF 1917
(Seedings were made in spring of 1916)

15D. S.P.L.	Variety or Source	Medicago Species	Fall 1916	Spring 1917	Per cent survived winter 1916-17	Vigour of Plants
25244	Grimm	Variegated	60	60	100 00	B+
29988	Grimm	Variegated	80	80	100 00	A—
D. L. 65	Grimm	Variegated	80	70	87 5	B—
D. L. 79	Can.	Variegated	85	65	76.4	A—
	Grimm (chk)		85	85	100.00	A.
F. C. I, 7611	Liscomb		68	43	63.1	C+
38138	Provence		60	9	15.	C—
19534	Samara Govt. Rus.	Falcata	70	70	100 00	B.
20717	Kharkov Prov. Rus.	Falcata	75	75	100 00	B+
20718	Omsk, Siberia	Falcata	80	80	100 00	A.
20719	Omsk, Siberia	Falcata	75	75	100 00	B—
20721	Samara, Russia	Falcata	75	75	100.00	B.
20725	Don province, Russia	Falcata	90	90	100 00	B+
20726	Samara prov., Russia	Falcata	80	80	100.00	B.
	Grimm (chk)	Variegated	95	95	100 00	A.
23625	Orenburg, Rus.	Falcata	75	75	100.00	B—
24452	Tomsk. prov.	Falcata	63	63	100.00	B.
24454	North of Irkutsk, Sib.	Falcata	80	80	100 00	B+
24455	North of Semipalatins.	Falcata	85	85	100.00	A.
26927	Kashmir, Ind.	Falcata	85	85	100.00	A—
28070	Semipalatinsk	Falcata	83	83	100.00	A—
28071	Semipalatinsk, Sib.	Falcata	78	78	100.00	A—
29139	Lehul, Ind.	Falcata	90	90	100.00	B+
30433	Lehul, India	Falcata	95	90	100.00	A—
	Grimm (chk)	Variegated	95	95	100.00	A.
30435	Yarkand, Turkestan		90	40	44.4	B.
32412	Krassny Koot Rus.	Falcata	90	90	100.00	A.
34116	Semi Palatinsk	Falcata	70	70	100.00	B—
35085	Novospaska, Russia	Falcata	35	35	100 00	C+
35086	Novospaska, Russia	Falcata	45	45	100.00	B—
35087	Novospaska, Russia	Falcata	40	40	100.00	C+
32389	Western Siberia	Falcata	35	35	100.00	C.
35312	Omsk, Siberia	Falcata	60	60	100.00	B.
20571	North Sweden	Variegated	90	80		B+
	Grimm (chk)	Variegated	90	90	100.00	A.
20714	Cossack	Variegated	90	85	94.5	B+

TABLE I—CONTINUED

15D, S.P.L.	Variety or Source	Medicago Species	Fall 1916	Spring 1917	Per cent survived winter 1916-17	Vigour of Plants
24451	Gobi Desert	Ruthenica	5	5		
26590	Algeria	Sativa Gaetula	90	15	16.6	
31687	Mongolia	Sativa Gaetula	75	70	93.3	A.—
	Grimm (chk)	Variegated	80	80	100.00	A.
	"Filler"					A.
14D	Grimm (chk)	Variegated	88	88	100.00	A.—
	Grimm (chk)	Variegated	88	88	100.00	A.—
38864	Argentina		87	4	5	
38643	Italy		90			
35437	India	Sativa	90			
33760	Morocco	Sativa	70			
	Grimm (chk)	Variegated	75	75	100.00	A.—
29353	Peru	Sativa	75			
14D 26629	Ecuador	Sativa	75	4	5.3	
21195	France	Sativa	80	2	2.5	
18627	Arabia	Sativa	80			
13481	Italy	Sativa	80	2	2.5	
12846	Algeria	Sativa	80			
38852	South Russia		95	92	96.8	A.—
31333	Russia		95	93	97.6	A.—
1488	Common		95	70	73.6	B.+
	Grimm (chk)	Variegated	95	95	100.00	A.
F. C. 1, 7612	Turkestan	Sativa	90	80	88.8	A.—
B 367	Montana		90	45	50	B.
D. R. 39	Redfield, S.D.		95	90	94.7	A.—
30203	Peruvian	Sativa	95			
27204	Mongolian	Sativa	100	90	90	B.+
39157	Sweden	Sativa	100	99	99	A.—
28208	Russia	Sativa	95	80	84.2	B.+
31815	Chinese Turk	Sativa	100	95	95	A.—
31814	Chinese Turkestan	Sativa	100	70	70	B.
	Grimm (chk)	Variegated	100	100	100	A.
24210	Chili	Sativa	100			
27803	Russia	Sativa	100	65	65	B.
28037	Samara, Russia	Sativa	95	90	94.7	A.—
30623	Palastine	Sativa	100			
	Grimm (chk)		100	100	100	A.
	"Filler"					A.

TWO-YEAR-OLD PLANTINGS

The two-year-old seedlings which were planted in 1915 suffered to a much greater extent than the one-year-old plants. This is true not only in the introductions block, but in all parts of the field and may be due to one or both of the following causes:—

(1) Some protection afforded the one-year-old plants by the snow held by the 1916 growth, which was not clipped back.

(2) The more or less depleted vitality of the two-year-old plants due to excessive production in 1916, some of which yielded at the rate of 8,000 lb. of dry matter per acre. This latter conclusion is perhaps further borne out by the fact that part of the row cut for seed was more completely killed out than that which was cut twice for forage.

The following table gives a fair idea of the injury sustained by a few representative 1915 introductions:—

Variety or Source	Medicago Species.	% stand fall 1916	% stand spring 1917	% survived winter '16-17
U.S.D.A. 35085.....	Falcata.....	30.....	25.....	83.....
U.S.D.A. 35086.....	Falcata.....	30.....	20.....	67.....
U.S.D.A. 35085.....	Falcata.....	35.....	10.....	28½.....
U.S.D.A. 28071.....	Falcata.....	75.....	5.....	62½.....
Semipalatinsk.....	Falcata.....	100.....	70.....	70.....
Hansen's Semipalatinsk.....	Falcata.....	100.....	X35.....	35.....
Hansen's Semipalatinsk	Falcata.....	95.....	60.....	63.....
McLaren's Obb.....	Falcata.....	70.....	XX65.....	93.....
Grimm.....	Variegated.....	100.....	20-60.....	20-60.....
Ont. Variegated.....	Variegated.....	100.....	.....	.....
Disco Pedigreed Alfalfa	Variegated.....	100.....	.....	.....
Cossack.....	Variegated.....	100.....	.....	.....
Turkestan	Sativa.....	100.....	.....	.....

X severe injury throughout.

XX good vigour.

The above table includes Grimm and Turkestan from at least 10 different sources and 10 variegated Disco alfalfas.

One more point is worthy of note. The alfalfa plots under field conditions that were not inoculated fared much worse than those that were inoculated. This is evident to such an extent as to entirely alter the character and appearance of the plots.

In view of the fact that hardiness, under our conditions, is a prime requisite of perennial crops we look upon the results of the past winter as highly desirable to assist us in the process of elimination and selection. There is no question but that even the most hardy varieties are the better for the plants which were killed out. In a few cases, where hardy rows were known to contain a mixture of foreign blood, the uniform appearance of dead plants in the row this spring testifies to their non-hardy character and thorough elimination.

THE HADIEST VARIETIES

In conclusion the Falcatas were

rather hardier than the Medias and the Medias much hardier than the Sativas. There was wide variation in hardiness among the Falcatas. Turkestan and most of the common alfalfas were practically a total loss. Among the Medias, or so-called variegated varieties, Grimm made an exceptionally good showing. In the one-year-old plot all strains are alive, but in the two-year-old one several strains suffered considerably.

Ontario Variegated, the improved strains from South Dakota and Cossack, were practically all killed out. An uninoculated plot of Grimm is almost a total failure, while inoculated plots adjoining stood the winter quite well.

Where protection was afforded by drifts of snow or as a result of deeper snow covering due to an autumn growth of from 6 to 10 inches the stand of all hardy varieties was nearly perfect, whereas in the absence of such protection many of even our hardiest varieties suffered severely.

BRITISH COLUMBIA

BY H. O. ENGLISH, B.S.A., CHIEF SOIL AND CROP INSTRUCTOR

THE winter of 1916-17, while somewhat long, was not very severe, and the alfalfa fields did not suffer greatly.

Climatic conditions vary so widely in British Columbia that it is not possible to select one variety of alfalfa as being best adapted to all districts.

In the Okanagan, the Thompson Valley and certain other parts of the Interior the more common varieties give about equal returns. The cultivation in such districts is the more important factor. The same may be said to be true, to a large extent, of alfalfa in coast districts, with the one difference that, while alfalfa is extensively grown in the aforementioned districts, there is only a limited area of land seeded to alfalfa in the latter.

At the higher altitudes in the Interior, *i.e.*, from 2,500 to 4,000 feet, only the hardier varieties survive. In these sections Grimm, Baltic and Turkestan are favoured in the order named. It is significant, however, that the majority of farmers throughout the province in purchasing seed of this crop do not distinguish between the varieties but are satisfied with "alfalfa" seed.

Soil conditions vary as widely as climatic conditions. Three general rules have been found to apply to the preparing of any soil for alfalfa:

- (1) The land must be well drained.
- (2) The cultivation must be thorough and deep.
- (3) The land must contain lime (must be sweet), to produce anything like satisfactory results.

The fall treatment of alfalfa plantations varies with local conditions also. We have noted fields of common alfalfa which were closely grazed by sheep until late autumn and which still produced heavy crops of hay. It is generally found, however, that the best hay crops are harvested from alfalfa fields which have been allowed to rest for a time in the autumn prior to the heavy frosts. A small growth of from four to six inches of alfalfa at the beginning of winter proves to be the best insurance against winter killing.

While the inoculation of the alfalfa seed is not generally recognized as absolutely necessary by our growers, the demand for this culture is increasing. The colour of the crop grown from inoculated seed is much darker than that grown from seed which was not inoculated. In rich soils the necessity for inoculation is not so readily noticeable as it is in the case of light soils deficient in humus.

The popularity of alfalfa as a forage crop in British Columbia increases each year and will continue to increase as the use of acclimated seed becomes more general.

It may well be borne in mind that no solution will give satisfactory and permanent results that is not based on the principle of supplying as far as possible our own wants, and producing in addition thereto something exchangeable at a profit for such commodities as we do not grow or cannot produce. Such a policy will lift us out of debt and set our feet on the highway of prosperity.—*Col. Cantley, Pres. Canadian Manufacturers' Association.*

FARM BOOK-KEEPING

QUEBEC

BY F. N. SAVOIE, B.S.A., SECRETARY, DEPARTMENT OF AGRICULTURE

A simple and practical system of farm book-keeping, prepared by Reverend Father P. Grondin, of Lévis, was published last January by the Department of Agriculture. This is in the shape of a note-book, $10\frac{3}{4} \times 8\frac{1}{4}$ inches, including twenty-six pages; there are two pages for each month, the left one for the receipts and the right one for the monthly expenses. The receipts and expenses of the year are summarized on the last two pages.

On the first page the farmer writes his name and address. The note-book is bound in thick but flexible cardboard of a dark colour.

There are seven columns in the monthly receipts page, one for the date, one for the designation of products sold, three for the amount received for the sale of each product, one for the summary and the last one for the addition of the various sales of the month.

It is stated in a foot-note that no account is taken of the work performed by the farmer on his own farm, as this is to a large extent compensated by the food eaten by the family.

The monthly expenditure page is divided into the same number of columns with this difference, that the articles enumerated are those that the farmer is likely to purchase during the month. Each of these pages is ruled in thirty-one lines, one for each day of the month. The last two pages are reserved for the total receipts and expenses of the year. They are divided into ten printed columns. The first is for the month, the second for a summary of articles purchased or sold, the other columns are for the amounts of each group of

items, the receipts of expenditure and the totals.

There is also a total of receipts for the year, a total of expenditure and the balance to the credit or debit.

As may be seen, this system of book-keeping is very simple. Our farmers are not accustomed to keeping a very detailed account and the author takes in only the general transactions, without any complications of items or of repeated amounts carried forward. However, before recommending the general adoption of this system, the Department has decided to make a trial of it. Thirty copies of the note-book were forwarded to the District Representatives, with instructions to have the same distributed among the most progressive farmers of their districts and to explain the method of procedure. At the end of the year, the District Representatives will visit these farmers, examine their note-books and make observations which shall be forwarded to us. Reverend Father Grondin will then make corrections if necessary, and a sufficient number of copies for general distribution will be printed with the approval of the Department.

The necessity of a good system of farm book-keeping is recognized by a large number of farmers, as indicated by the many requests for information that are received on the subject. This is one of the good results of the teaching in our agricultural schools and of the short courses given each year in the province.

It is gratifying to note that our agricultural class is improving and eagerly seizes all the opportunities to increase production, which has been such an important question of late.

MACDONALD COLLEGE

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

IN our college work we make farm book-keeping a feature of farm management and include within it farm and live stock records. The loose leaf system is adopted in connection with record work and to some extent in farm book-keeping, especially for farm report work on large farms.

For the average farm we have been emphasizing a system very similar to the Newman-Bates system. Now

that it has appeared and is available for distribution and use, we are recommending it to our students and to the farming community. In our opinion this system fulfils the requirements which are most vital in farm book-keeping, and consequently it does not differ materially with what we have been trying to teach and advocate. It is simple, divisional and complete with a minimum of amount of book-keeping.

ONTARIO

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

WHAT appears to be an extremely simple and satisfactory plan of farm book-keeping has recently been adopted by the Ontario Department of Agriculture. It was worked out by Mr. A. Leitch, who is in charge of the Farm Management work at the Ontario Agricultural College, Guelph. It is very simple and meets the needs of the average farmer in every way. The Department has supplied each District Representative with four books and instructions to loan them to farmers who will agree to keep farm records providing that the District Representative may have access to them at all times. Any information secured in this way will be considered as confidential.

As this is a loose leaf system the Department is also arranging to supply farmers with a complete set minus the binders free of charge. As a result of this plan a great many farmers, particularly young farmers, throughout the province have started keeping farm records, and it is hoped that this number will be added to very considerably from year to year. As an indication of the interest in farm records it might be mentioned that

out of a class of one hundred and thirty (130) farmers and farmers' sons attending the short course at Guelph this year one hundred and three (103) expressed the desire to keep farm records. All these farmers are being supplied with the Leitch farm-book-keeping system.

The Newman-Bates system, while slightly more complicated, is exceptionally well suited to farmers who wish to keep a more detailed record of their farm business. All District Representatives have been supplied with this system of book-keeping, not only that they may be familiar with the same, but so that they will be able to show it to farmers who are interested.

NOTE.—The Newman-Bates system of farm book-keeping has been worked out by Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association, with the assistance of Mr. Bates, a chartered accountant, Professor A. Leitch, of the Ontario Agricultural College, Mr. J. H. Grisdale, Director of Experimental Farms, Professor J. B. Reynolds, President of Manitoba Agricultural College, Professor H. Barton, of Macdonald College, and others. It was evolved primarily to meet the requirements of the farmer upon his own farm. The system includes two main books—a cash book-journal and a year book—so ruled as to enable one to ascer-

tain exactly how each department of his farm is progressing at all times, and to show the exact financial condition of each department and of the whole of his business at the end of his business year. The cash book-journal consists of parallel columns so arranged that the expenses and the revenue in each department or branch of the farm are shown separately. Into this book are entered all transactions whether

they be cash or credit. The year book consists of a series of blank forms so arranged as to enable a man of average intelligence, though he may have no training whatever in book-keeping, to assemble at the end of the year the various items which together indicate the profits or loss in each department and finally on the whole year's business.

SASKATCHEWAN

BY EDWARD OLIVER, ACTING SECRETARY STATISTICS BRANCH

THE Department of Agriculture of Saskatchewan is fully alive to the importance of a good system of farm book-keeping.

The question has been brought to the attention of the farmers in a variety of ways, and for several years cash prizes have been offered for competition amongst farmers, who were invited to submit their accounts to the judgment of the Provincial Auditor.

It is recognized, however, that the profession of book-keeping is one thing and that of farming is quite another, and that a man is seldom an expert in both subjects. The Department is, therefore, convinced that any elaborate system of cost accounting is not practicable for the busy farmer, and, in fact, even if cost accounting is carried on to such an extent that it becomes almost a hobby, experts will admit that at the best it will give little more than an approximate idea of the relative value of the different undertakings of the farmer.

Intricate synoptic systems have been devised from time to time for farmers and placed on the market,

but little improvement has been made in farm accounting generally, for the reason that, even if the farmer starts such a system, he seldom or never has either the time or the inclination to keep it up, though he may recognize its value quite clearly. The Department has, therefore, in the past confined itself to an effort to induce the farmers to adopt merely a simple form of annual inventory, which, if it serves no other purpose, is at least easily kept up, and will, at all events, show the progress or otherwise made from year to year. If he likes, the farmer can at the same time keep more detailed accounts, but, from the use of the inventory alone, he will derive many a useful lesson and will find it a valuable guide in his future operations.

The Department now has in preparation a farmers' book-keeping manual, which, while it goes a little further, still preserves as its main feature this simple inventory, and, at the same time, recognizes that the simplest and least complicated system of keeping accounts is not only what the farmer wants, but is the only system he is likely to persevere with.

ALBERTA

BY E. S. HOPKINS, DEPARTMENT OF AGRICULTURE, EDMONTON

THE Alberta Department of Agriculture has confined its attention on the problems of farm book-keeping chiefly to the students in the schools of agriculture. At these schools, systematic courses in book-keeping are taught to the agricultural and domestic science classes.

The men in the agricultural classes are instructed how to classify their capital, arrange their accounts and take their inventories and determine when their profits and losses occur. The women in the domestic science classes also receive considerable instruction along similar lines to that taken by the men, because it is thought that the women can be of great assistance in keeping the ac-

counts of the farm, possibly doing the work entirely themselves. They also receive information regarding household accounts, the purchase of groceries, clothing and furniture and material used from the farm.

The Department of Agriculture has made a special effort to secure a farm account book which would be usable on the farm. Frequently, books published for this purpose have been too elaborate and unnecessarily complicated. The book now issued is believed to meet this requirement very satisfactorily. While the circulation will be chiefly among the students at the schools of agriculture, it will be available to every farmer who desires to purchase it.

BRITISH COLUMBIA

BY W. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

WE are taking steps towards having a practical bulletin on farm book-keeping issued by this Department for distribution to farmers. When this is ready, it will be put in the hands of all the members of our farmers' institutes,

amounting to about 9,000, and all those who have not heretofore done it will be encouraged to start a simple form of farm book-keeping, by means of lectures given by officials of this Department at our regular fall institute itinerary.

"I feel it my duty to emphasize that the food situation is one of the utmost gravity, which, unless it is solved, may possibly result in the collapse of everything we hold dear in civilization"

"The only hope of providing the deficiency is by the elimination of waste, and actual and rigorous self-sacrifice on the part of the American people"

"We must also plant everything and everywhere it will grow, or this time next year the food problem will be absolutely unsolvable, and the world will face absolute starvation."—*Herbert C. Hoover, U. S. Food Administrator.*

DEMONSTRATION SHEEP FLOCKS

MACDONALD COLLEGE

BY A. A. MacMILLAN, B.S.A., IN CHARGE OF SHEEP HUSBANDRY

THE demonstration sheep flock forms an important feature of the extension policy of the Animal Husbandry Department of Macdonald College. The scheme was evolved as a direct result of the apparent indifference on the part of many Quebec farmers to sheep raising as well as a general lack of knowledge of improved methods in breeding, feeding and management. The plan was made feasible through the provisions of THE AGRICULTURAL INSTRUCTION ACT, and in 1913 the first two flocks were established from imported stock. The returns from these and a further importation in 1915 of sixty-four ewes and six rams made it possible to establish twelve more flocks.

The Cheviot was selected as a breed most suited for this work in Quebec. It was felt that many of the larger and older established breeds while suited for the better farming sections were not sufficiently hardy and active for the rougher and more broken parts, which were adapted for sheep raising and where the greatest expansion was to be encouraged. The Cheviot originated under conditions similar to those prevailing in the province and its value for crossing on Leicester blood made it a popular choice for the improvement of grade flocks.

The establishment of flocks was confined to counties where the most favourable opportunities for improvement in breeding and management presented themselves, and where interest in sheep raising was lacking. As only a few flocks could be established with the number of sheep available, the practice has

been to place one or two flocks only in the selected counties.

The success of the demonstration flock depends largely on the farmer in whose charge it is placed. After approaching as many men as possible with regard to their interest in sheep raising and their desire to undertake the management of a flock, the final choice is made where a central location is combined with a good sheep farm with some equipment, the same being managed by a farmer who has not only the respect of the community but who has a natural liking for sheep and who has had some previous experience in sheep raising, if possible.

SIZE OF FLOCK AND RETURN OF LAMBS

Nine pure-bred ewes and a ram constitute a flock, it being understood that the farmer has a grade flock, often to fifteen ewes, which are run in conjunction with the pure-bred flock to ascertain the value of the Cheviot for crossing purposes and to show the advantages of a pure-bred ram.

Twelve ewe lambs and two ram lambs are returned to the College in three years, at the end of which time the original flock, together with all individuals not included in the above returns, become the property of the farmer in whose charge the flock has been placed. In addition to the return of lambs the College receives an annual report of all expenses and receipts pertaining to the flock. The establishment on the basis of a return of an increase over and above the original stock makes the scheme continuous from year to year and allows of further expansion.

GENERAL METHODS OF MANAGEMENT

The demonstration flocks are handled under average farm conditions. The ewes are housed in cheap, dry, cool buildings. They are allowed abundance of exercise and are fed mainly on roughage in the form of mixed hay or clover, supplemented with cereal straws such as pea, bean, and oat. Grain is fed sparingly except previous to and after lambing. Roots when available are fed throughout the entire winter, the amount being reduced to one or two pounds as lambing time approaches. The ewes are bred to lamb in April or the first of May so that the lambs are

of surplus stock has been confined to the local districts in which the flocks are placed, the object being to use the flocks as distributing centres, particularly for rams. Distributions affected in this way are already having a direct effect on the blood lines of the sheep in the various communities and through this channel of effort the farmers are presented with a concrete example of the value of pure-bred sires and the advantages of community breeding in obtaining greater uniformity and better market values in the production of both wool and lambs. There is little or no surplus of female stock owing to the



A MACDONALD COLLEGE DEMONSTRATION FLOCK

two to three weeks old before going to pasture. Under this system of management the annual cost of maintenance is low and good results are obtained.

The ewes as a whole have averaged slightly better than a lamb each per year and have netted a good profit after charging them up with winter feed and pasture. The average cost of maintaining a ewe throughout the year 1914-15 was \$2.73, while the average return per ewe was \$9.11, giving a net profit of \$6.38 per ewe. In all cases feeds are charged, and wool and lambs are credited at market prices in the districts in which the flocks are established.

DISPOSAL OF SURPLUS STOCK

In as far as possible the disposal

fact that such a large proportion of the ewe lambs are returned to the College, these in turn being used for the establishment of other demonstration flocks.

EDUCATIONAL FEATURES OF THE DEMONSTRATION FLOCKS

In disseminating up-to-date methods in breeding, feeding and management, the demonstration flock is used as a pivotal base. They provide classes for instruction in judging. The buildings and equipment serve as models for neighbouring farmers. The practices and methods in feeding are always applicable to district flocks. Demonstrations and talks on dipping, docking and castrating of lambs, proper

methods in shearing and the preparation of the fleece for market serve as a means of distributing desirable information on these operations, and profits which are always kept in view serve as a guide as to what may be expected as an average return per ewe.

The demonstration flocks have been a very effective means of creating a greater interest in sheep raising, and while as yet it is not possible to fully estimate their real value, this much holds true, that they offer a splendid channel for effective means of flock improvement.

ONTARIO

BY R. W. WADE, B.S.A., DIRECTOR LIVE STOCK BRANCH

THE sum of \$2,000 has been voted by the Legislative Assembly of Ontario towards the encouragement of the raising of sheep in the province.

Twenty flocks will be distributed during the fall of 1917. The flocks will consist of five or six head of grade shearling ewes and will be sent to young farmers who will compete for the same. The District Representatives will hold judging classes and the winner in each county will be given a flock.

The winner of each flock will hand back to the Live Stock Branch, at

the end of the second, third and fourth years after receiving the sheep, one-third of the number of shearling ewes received. These will be utilized for further distribution. After the fourth year the Department will cease to share in the increase.

There will also be presented to the Department, up to the fourth year, a statement from the winner giving number of sheep received, date of lambing, weight of wool, date of weaning, lambs sold, lambs retained, size of flock, and any other information that may be of general interest.

SASKATCHEWAN

BY W. H. J. TISDALE, B.S.A., ASSISTANT PROFESSOR OF ANIMAL HUSBANDRY, UNIVERSITY OF SASKATCHEWAN

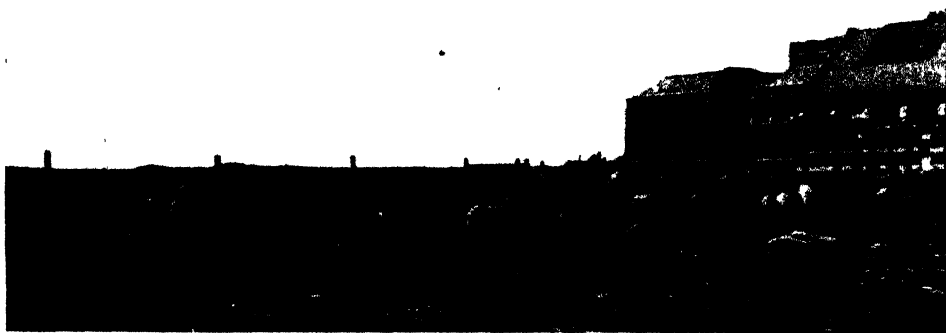
THE flock of grade and pure-bred sheep maintained at the University of Saskatchewan is practically the only demonstration flock in the province. No flocks have been established as yet by the provincial Department of Agriculture except in so far as the small flocks supplied to farmers through the live stock distribution policy of the Live Stock Branch may be termed demonstration flocks. They serve to impress upon the farmers in any district the profitability of sheep raising and the place that sheep should occupy in our western agriculture.

Regarding the University flock, it is at present composed of a number

of small breeding flocks of pure-breds as well as a fairly large flock of original range and grade ewes. The pure-breds are representative of the Shropshire, Southdown, Suffolk, Oxford, Hampshire and Leicester breeds, and by housing them according to western methods and feeding with western feeds, an effort is being made to determine those breeds best suited to the western farmer and his conditions. The flock of range and grade ewes which has given most excellent results is gradually being graded up by the use of rams of the above mentioned pure breeds. An accurate account is being kept of daily and monthly gains of the lambs

produced in each case; the ultimate value of the different carcasses upon reaching the market is being determined and it is hoped that in a very short time, we shall have some definite information to impart as to the breeding rams likely to give most profitable returns from both a mutton and wool standpoint when used upon the common range stock of the country. A great many of these sheep, pure-bred and grade, are used as well in the classroom for the purpose of teaching market and breed types.

tained, certain definite information is available for distribution amongst the farmers and the agencies that effect this distribution are numerous and varied. The agricultural press helps materially by the publication of written articles that deal with various phases of the work and results obtained. Live stock conventions, short courses in agriculture and better farming trains all offer opportunities of bringing the experiments to the notice of those vitally interested, while the people who visit



SOME OF THE BREEDING EWES WITH LAMBS AT THE COLLEGE OF AGRICULTURE,
SASKATOON, SASK.

Any surplus stock that has been disposed of thus far has found a ready sale at reasonable prices amongst farmers desirous of starting in a small way. A few small flocks of 8 or 10 grade ewes have been sold in this manner and it is quite easy to find a place for all the pure-bred rams that are raised. Prices for the latter have ranged from \$25 to \$50, depending upon the type and general breeding quality of the animals sold.

From the investigations that are carried on and from the figures ob-

the University on excursions and otherwise have the chance of viewing the results to their own satisfaction.

It is the wish of those connected with the work to have the College of Agriculture occupy a very important and vital place in the up-building of the sheep industry in Saskatchewan. Being in "on the ground floor" so to speak, and having a chance to develop with the industry there is no reason why it should not be a place of much interest to all sheepmen in the province.

GRADUATES OF AGRICULTURAL COLLEGES

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., PRINCIPAL

THE following is a list of graduates of the Nova Scotia College of Agriculture for the year 1917, with their occupation:—

Robert Marshall Wood, Carter's Point, N.S., farming.
James Carleton Stewart, Malagash, N.S., farming.
Thomas Carl Munn, Leitch's Creek, C.B., District Representative in Cape Breton.
Stanley Hawthorne Morrison, Wolfville, N.S., farming.
Frederick Waldemar Walsh, Middle Cloverdale, N.B., farming.
Thomas Roland Goudge, Sackville, Halifax, Co., N.S., farming.

John Roderick Sutherland, Baddeck, C.B., Mgr. Nova Scotia Government Creamery.
Edmund Flavien Pineau, Strathmore, Alta., C.P.R. Dept. of Natural Resources.
Daniel Everett McLeod, Loch Katrine, N.S., Mgr. Creamery.
Allain Calixte Belliveau, St. Joseph, N.B., occupation not decided.
John Elwood Briggs, Wellington, N.S., farming.
George Strudwick, Truro, N.S., in charge Dairy Nova Scotia College of Agriculture.

This is just 25 per cent of the number of graduates we had prior to the war.

MACDONALD COLLEGE

FOLLOWING are the graduates of class 1917 with their occupation or positions:—

Bothwell, A. F., South Durham, P.Q., farming.
Cunningham, H. S., Tatamagouche, N.S., Agricultural Extension Work for N.S. Agr. College.
Dickson, G. H., Rectory Hill, P.Q.
Elliott, R. M., Danville, P.Q., McGill Siege Battery.
Fiske, R. C. M., Florenceville, N.B., farming.

Hetherington, T. H., Ste. Anne de Bellevue, Asst. editor, Canadian Farm and Dairy.
Jones, L. R., Sabrevois, P.Q., McGill Siege Battery.
Morris, C., Ste. Therese de Blainville, P.Q., McGill Siege Battery.
Newton, W. J., Plaisance, P.Q., McGill Siege Battery.
Reid, W. J., Chateauguay Basin, P.Q., McGill Siege Battery.
Roy, L. C., Sabrevois, P.Q.
Spicer, E. C., Spencer's Island, N.S., Royal Flying Corps.
Wood, E. G., Lachute, P.Q., farming.

OKA AGRICULTURAL INSTITUTE

BY BR. JEAN DE LA CROIX, DIRECTOR

Following is a list of this year's graduates at Oka Agricultural Institute:

Chas. A. Fontaine, Albert Héroux, Roméo Cossette—are now professors at the Institute.

Jos. Reddy, officer of the Dairy Division, Provincial Department of Agriculture.

Gustave Couture, studying veterinary science.

Emile Gosselin, intends taking up farming immediately.

Ernest Pintal, intends to complete his commercial training by a one-year course at the Quebec normal school.

Paul Brunel, Emile Lemire, Omer Lacerte, Armand Létourneau, Joseph Montour, Albert Plante, Emile Rinfret, Xavier Rodrigue, Lucien Therrien, Arthur Tremblay, Conrad Meunier—intend working on farms until they have a sufficient capital to start farms of their own.

STE. ANNE DE LA POCATIÈRE

FOLLOWING are the graduates of the School of Agriculture, Ste. Anne de la Pocatière, with their occupations:—

M. M. Evangeliste Poulin, Assistant District Representative.
Wilfrid Chamberland, Assistant District Representative.

Roger Gagnon, Assistant District Representative.

Jim Gautreau, Live Stock Branch.

Louis Pelchat, Experimental Farm, Lennoxville, Que.

Zenon Belanger, farmer.

Camille Bouchard, farmer.

Louis Duclos, farmer.

ONTARIO

FOLLOWING are the graduates of the Ontario Agricultural College, Guelph, in May, 1917, with their positions or occupations:—

Aiton, R. M., enlisted.

Austin, W. J., recommended for position as District Supervisor of Agricultural Education, Dept. of Education, Victoria, B.C.

Clark, H. W., Assistant District Representative, Brampton, Ont.

Davey, A., Dept. of Chemistry, O.A.C., Guelph.

Elliott, D., Live Stock Branch, Dept. of Agriculture, Ottawa.

Evans, O. C., farming, Chilliwack, B.C.

Fancher, P. L., corn investigations and experiments, Dept. of Agriculture, Chatham, Ont.

Fleming, R. R., farming, Orton, Ont.

Gardiner, W. F., munitions worker, Collingwood, Ont.

Griffin, R. J., farming, R.R. 1, Sarnia, Ont.

Guild, A. W., student pastor, Mildmay, Ont.

Hearle, E., Dept. of Entomology, O.A.C., Guelph, (temporary).

Lawson, E. V., farming, R.R. 3, Goderich, Ont.

Marritt, W. G., District Representative, Collingwood, Ont.

Martin, I. B., (enlisted).

Merkley, F. K., farming, Williamsburg, Ont.

Murdoch, F. G., farming, Guelph, Ont. McConkey, O., (enlisted.)

McCready, S. B., lecturer, Greater Production Campaign, Dept. of Agriculture, Toronto.

MacKenzie, A. M., Fellow in Chemistry, O.A.C., Guelph.

McKillican, L. W., farming, Maxville, Ont.

Neale, J. C., farming, Caledonia, Ont.

Neff, H. W., Asst. District Representative, Simcoe, Ont.

Redmond, A. A., Dairy Manager, Elkhorn, Man.

Schurman, D. C., farming, North Bedeque, P.E.I.

Skinner, A. G., farming, St. Mary's, Ont.

White, A. H., (enlisted).

Zavitz, R. W., farming, Coldstream, Ont.

MANITOBA

FOLLOWING are the graduates of 1917 from Manitoba Agricultural College, with their occupation:—

Brown, George H., working his own farm in Manitoba.

Clark, Alexander J., Assistant Live Stock Commissioner for Saskatchewan.

Fahrig, Walter, enlisted in the Canadian Army Medical Corps.

Hallwright, Horatio E., employed by the Forestry Branch of the C.P.R., Calgary, Alberta.

Kiteley, James H., Extension Lecturer, Department of Field Husbandry, Manitoba Agricultural College.

Lewis, Robert J., working his own farm in Saskatchewan.

Weir, Charles A., temporary lecturer in Animal Husbandry, Manitoba Agricultural College.

UNIVERSITY OF SASKATCHEWAN

Following are the names of the graduates from the College of Agriculture this year:

L. E. Kirk, B.A., B.S.A., Instructor in Field Husbandry.
 A. W. Henry, B.S.A., Instructor in Field Husbandry.
 W. E. Walker, B.S.A., District Representative.
 Hugh Ross, B.S.A., Student Assistant in Animal Husbandry.

E. A. Lloyd, B.S.A., doing extension work in Poultry Husbandry for the summer months in connection with the Better Farming Train, Fairs, etc., under the auspices of the Department of Agriculture and the University.

L. E. Kirk won the Governor-General's gold medal which is awarded to the most distinguished student in the University in his graduating year.

ALBERTA AGRICULTURAL SCHOOLS

The following gives the number of students graduating and completing the first and second years at the Alberta Schools of Agriculture, 1917:

School	Year	Boys	Girls
Claresholm	1st.	23	21
	2nd	15	7
Vermilion	1st.	23	15
	2nd	16	4
Olds	1st.	33	31
	2nd.	24	7

THE LATE SIR WILLIAM MACDONALD

In the death of Sir William Christopher Macdonald, which occurred at Montreal on June 9th, 1917, the twin causes of education and agriculture suffered a grievous loss. He had been the greatest benefactor to those causes Canada had known. Born in Prince Edward Island in 1831, Sir William had reached his 86th year and had lived long enough to see the seed he had sown bear abundant fruit. As stated in THE AGRICULTURAL GAZETTE, Vol. 1, page 519, it was in the year 1898 that his great benefactions, which amounted to millions of dollars, took root. In that year out of funds provided by him, twenty-one manual training centres were established in connection with public schools at different points in Canada. At the instance of Dr. James W. Robertson following this, the deceased gave \$10,000 to be used in prizes for seed grain competitions between boys and girls. Then came the Macdonald School Gardens and Consolidated Schools movement. In 1901, he provided funds for the erection of Macdonald Hall and the Macdonald Institute at Guelph. But the crowning benefaction of a long and useful life was the creation and endowment in 1905, at a cost exceeding \$6,000,000, of Macdonald College at Ste. Anne-de-Bellevue, Que., in affiliation with McGill University, also as described in Vol. 1 of THE AGRICULTURAL GAZETTE, page 551. Sir William continued his liberality to the end and by legacies provided for their maintenance and extension.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. G. ARCHIBALD, COLLEGE OF AGRICULTURE

THERE are at present five County Representatives in this province employed under the provisions of THE AGRICULTURAL INSTRUCTION ACT. The territory covered by these men includes all four counties in the Island of Cape Breton and the counties of Antigonish and Guysboro, these last being the most easterly counties on the mainland. Besides their usual work of encouraging production and helping the farmers in general with their difficulties, these men are at present busily employed in developing the co-operative marketing of wool. In the county of Antigonish this work has been going on for two years, and in Guysboro for one year. A large increase in the wool marketed, estimated at 25,000 lb., is anticipated. In Cape Breton the work is new, but, judging by the interest taken, a good beginning will be made. All this is being done in conjunction with, and under the direction of the Sheep Division of the Live Stock Branch of the Federal Department of Agriculture.

In Cape Breton, large numbers of demonstration plots of turnips are being established at prominent places. This crop has been chosen because it is regarded as one of the most important from the standpoint of production of cheap food for cattle under the conditions prevailing in that district. The farmer on whose land these plots are placed agrees to follow up this crop with a systematic rotation of other crops, a practice all too poorly followed in a large part of Nova Scotia.

LIMESTONE CRUSHERS

For the past five years the Nova Scotia Department of Agriculture has carried on investigations with ground-limestone. In the main results have been confined to a better stand of clover and the eradication of club-root on turnips. On the college farm the difference in the growth of clover in favour of the lime-treated plots amounted to a ton extra per acre on two cuttings in one year. On the other hand, it is only right to state that on some adjacent plots the difference between treated and untreated has been practically *nil*. Last year on a rather richer field, while there was more clover in the lime-treated plot than in the check plot, yet there was practically no difference in the yield of hay. The difference in a crop of turnips where crushed limestone was tried for its effect on club-root was 100 bushels per acre.

Varying reports have been received from experiments throughout the province. Nevertheless there are five plants in Nova Scotia where limestone is being ground for agricultural purposes; it will, therefore, clearly have a good try-out.

With a view to carrying on extensive demonstrations in one of the outlying parts of the province arrangements have been made, by which, under the provisions of THE AGRICULTURAL INSTRUCTION ACT, one of these portable lime-crushing plants has been hired and will operate through this Valley for the summer. The farmers will quarry their own rock and the Department will grind it at a minimum price. It is thus planned to encourage farmers to use

larger applications than ordinarily when the current price is paid. Many of the farms where the demonstrations are being carried on are in run-out condition, so that a good chance will be given to study the possibility of rejuvenation of these through the medium of limestone clover. This work is under the direction of L. C. Harlow, Professor of Chemistry of the Nova Scotia Agricultural College.

EXPERIMENTS WITH ROCK PHOSPHATE

Prof. J. M. Trueman, head of the Agricultural Department at this Institution, has begun some experiments with ground rock phosphate or "floats" in comparison with acid phosphate and basic slag, which are the principal sources of phosphoric

acid in Nova Scotia.

Those familiar with the work of Dr. Hopkins of Illinois and others will know that they have given a high report of the value of the untreated rock. Most of their experiments, however, have been carried on in areas where humus is largely present in the soil. In general, results from the Eastern States do not seem to have been as striking as in Illinois. Possibly the extra moisture of Nova Scotia may have the effect of making this source of phosphoric acid more available here.

The ground rock costs, landed here, somewhat less than acid phosphate but contains practically twice as much phosphoric acid. It is being used on both hoed crops and pasture land, this latter being ploughed and seeded down.

DAIRY COMPETITIONS

DAIRY competitions are being held in Cumberland and at Scotsburn by the local creamery companies. Prizes are offered in each instance for the largest amounts of butter fat delivered by patrons to the creamery from January 1st to December 31st, 1917. At Scotsburn there are two classes, the second being open to all patrons supplying cream locally or shipping it from Meadowville or any station east. The prizes are furnished by merchants, bankers and officials, the Provincial Dairy Superintendent, for instance, giving a silver trophy to the owner of the herd making the highest average per cow and the Recorder of the District \$5 to the owner of the herd making the highest average per cow who also keeps herd records, both in the Cumberland competition.

PRIZES FOR RURAL SCHOOLS

The Provincial Dairy Superintendent offers at Scotsburn a similar prize to the one he gives in Cumberland and the Recorder of the Scotsburn Dairy Record Centre offers ten dollars' worth of books to the school library of the section sending in the largest number of complete herd records. Non-patrons as well as patrons will be considered in awarding the last mentioned prize. A local bank manager offers a prize to the rural school, a student of which presents the best essay on the value of cow testing in the building up of a dairy herd.

No herd with less than five cows is eligible for competition and in the record competition, the records of six herds are necessary for a prize.

QUEBEC

THE MAPLE SUGAR AND SYRUP INDUSTRY, SEASON 1917

BY F. N. SAVOIE, B.S.A., SECRETARY PROVINCIAL DEPARTMENT OF AGRICULTURE

THE three sugar-making schools established in 1914 by the Department of Agriculture, at Ste. Louise, Beauceville and La Minerve, were worked this year for

exactly one month, from March 29th to April 29th.

The season's results are given in the following comparative table:—

Sugar Making Schools	Superintendent.	Number of maples tapped	Number of Gallons of sap gathered	Quantity of sugar made	Quantity of syrup made	No. of pupils	Number of visitors
La Minerve	J. H. Lefebvre.	3,000	19,900	55 lb.	492 gals.	7	38
Ste. Louise.	L. J. A. Dupuis	4,500	18,580	175 lb.	484 gals.	44	240
Beauceville	J. E. G. Bolduc	3,000	16,400		319 gals.	5	170

In addition, 400 pounds of sugar candy were also manufactured by M. L. J. A. Dupuis.

On the whole, the cost of manufacturing has been higher than usual this year. This is due, according to the superintendents, to the cold temperature and the long sugar season.

On the other hand, prices obtained have been much better than usual. Syrup of first quality sold for \$1.50 to \$1.75 per gallon, and sugar from 14 to 16 cents per pound.

LECTURES AND PRACTICAL DEMONSTRATIONS

In reply to a large number of requests and in order to teach proper methods of sugar and syrup making, five instructors (two more than last year) were instructed this year to give lectures and demonstrations on the best methods. Each one of these instructors, provided with the necessary apparatus, visited one or several

sugar-houses in a locality and gave demonstrations in manufacturing while explaining the methods. At several places, the instructors had to give lectures in public halls, the audience being too numerous for the sugar house.

The number of sugar houses visited, in the counties where such demonstrations were given, is shown in the following table:—

	Number demonstr'ns	Total attendance
Arthabaska..	16	240
Beauce....	9	275
Champlain...	4	118
Portneuf....	7	245
Temiscouata.	7	188
Vercheres....	3	77
Yamaska....	3	154
76 counties...	49	1,297

Some 15 sugar makers were also visited in the vicinity of the sugar houses where the demonstrations were given.

NOTES OF AGRICULTURAL AFFAIRS

THE two clover threshers loaned free of charge to farmers by the Quebec Department of Agriculture have completed their demonstration campaign on the threshing of clover seed. Over eighty thousand pounds of clover seed have been obtained. The 125 threshers purchased by the farmers' clubs with the help of subsidies from the Department of Agriculture, have threshed this year 431,352 lb. of seed.

A live stock and good stables competition has just been completed by the agricultural association of Temiscouata county. A maximum of forty points was allowed as follows: condition and quality of cows, 10; condition and quality of calves, 10; general condition of stable, 20.

The sugar house which has been conducted for the last eleven years by Mr. H. H. Lefebvre, secretary of the Co-operative Association of Pure Maple Sugar and Syrup Makers, is now used as a sugar-making school by the Department of Agriculture. Three thousand trees are tapped, from which thirty-five gallons of pure sap were obtained daily last season. This sap goes to the sugar-house in four two-inch pipes which follow the natural lay of the land. Three different kinds of covers are used for the pails: wooden, cardboard and galvanized sheet iron. The cardboard covers are not recommended; the galvanized iron covers are costly, whilst the wooden ones are more economical but cumbersome. This plant has, at present, two evaporators twelve and sixteen feet long, respectively. Since this sugar-mak-

ing school has been established, twenty-eight evaporators have been purchased in the district and a general improvement in the manufacturing methods has been noticed. The past season was favourable for the industry, and sugarmakers are generally satisfied with the results obtained.

Six new horticultural associations have been established during the winter. These associations are now engaged in the renovation and pruning of old orchards. The Horticultural Division has secured the services of six new employees, one of whom is a landscape expert and another one a horticulturist.

Eleven thousand three hundred packages of cabbage, beet, sweet corn, carrot, celery, cucumber, bean, lettuce, turnip, onion, radish and tomato seed have been distributed to the school gardens of the province. As a result several big school gardens have been established in Quebec and Montreal.

The Horticultural Division has given lectures and demonstrations in the most important horticultural and colonization centres in the district of Montreal, whilst a special short course has been given in the horticultural centres of Joliette, Nicolet, Lotbinière and Montmagny.

Demonstration fields for the testing of varieties of vegetables and small fruits, suitable for canning purposes, will be established near the principal canning factories of the province.

ONTARIO

THE CONDITION OF APIARIES

IN response to a circular sent by Mr. Morley Pettit, Provincial Apiarist, to the members of the Ontario Bee-keepers' Association, four hundred and twenty-one reports were received. These bee-keepers reported 24,425 colonies in good condition this spring from 27,159 colonies put away last fall. This shows an approximate loss of ten per cent. The heaviest losses were in the southern counties, where the usual

protection given was insufficient for the extreme weather conditions that prevailed. Starvation is given as another cause of loss and was more general over the province, owing to the length of winter and backward condition of the spring. Since clover has suffered from spring killing, and bloom is extremely late, the 1917 honey crop is not likely to be as heavy as usual.

WORK OF THE TRACTORS

FROM AN OFFICIAL STATEMENT BY THE PREMIER AND MINISTER OF AGRICULTURE

PRELIMINARY reports of the work done by the farm tractors purchased by the Department of Agriculture prove that they have been the means of adding considerably to the acreage under spring crops. In all 30 tractors have been purchased by the Department and are operating in 22 different counties. The list includes 9 different makes handled in this province so as to provide the greatest possible variety of experience. With these have been supplied three bottom ploughs and disc harrows. The District Representatives, who have in each case supervised the work in the local counties, were instructed to place the tractors at the disposal of individual farmers for use in preparing land for spring crops on a basis of the cost of labour while actually at work on the farm at 35 cents per hour and the cost of fuel, including gasoline or kerosene and oil. Kerosene has been used in about 90 per cent of the work, having been found much more economical than gasoline at present prices. On this understanding the

District Representatives received numerous requests from farmers who still desired to prepare land for the later crops, and as a consequence it was necessary to supply two tractors to several counties in order to meet the demand.

The chief interest centres in the amount of work done in a day and the cost. As to this point there is naturally considerable variance owing to the varying conditions of the soil and other factors. In some cases as high as two-thirds of an acre of land was ploughed in an hour, while in others the rate did not exceed one-third. For discing the rate ranged from $1\frac{3}{4}$ acres to $2\frac{1}{2}$ acres per hour. These figures do not give the entire usefulness of the tractor on the farm, as the engine can be used on the belt in chopping and other farm operations when not in use on the land. The tractors are of the type known as 8-16 or 10-20 h.p., the larger figure referring to the horse power in operations such as ploughing and the smaller to the horse power on the belt.

The Department has received numerous requests for the use of tractors in preparing land for fall wheat and also for the regular fall ploughing. Applications have been received for a number of tractors beyond those already purchased by

the Department. It is proposed that the whole matter shall be discussed at a conference of the District Representatives a little later on when final figures for work done this spring will be available.

DISTRICT REPRESENTATIVE ACTIVITIES

THE following notes are taken from the reports of District Representatives at the end of May to the Department of Agriculture at Toronto:—

ALGOMA COUNTY

A. S. Smith:—

For the use of the Production Campaign Committee I have purchased 335 bags of seed potatoes. It will be necessary to secure 150 bags more to supply the demand. We are growing in the city green houses about 10,000 plants each of cabbage, cauliflower, tomato and celery. These will be supplied to the citizens practically free of cost.

MIDDLESEX COUNTY

R. A. Finn:—

Practically every house in the city of London has a garden. Beans and potatoes are the chief crops planted on the larger areas. The smaller plots are devoted chiefly to green stuff for summer use. I am securing for the Rotary Club a carload of potatoes to be given out to their members for planting purposes.

TIMISKAMING COUNTY

W. G. Nixon:—

I have addressed the Soldiers' Wives Club at Cobalt on the subject of gardening, particularly potato culture. This club has five acres of land. All the townspeople are taking a keen interest in food production.

HALDIMAND COUNTY

G. W. Woltz:—

Production and thrift is the live topic in this district. I have attended enthusiastic meetings of business men and farmers with a view to helping to solve the labour problems and to use vacant properties in the town districts for vegetable growing.

YORK COUNTY

J. C. Steckley:—

We have helped in the Greater Production Campaign in Newmarket. This is under the auspices of the Board of Trade who are offering prizes to school children ploughing lots for some of the poorer people and supplying seed potatoes on credit.

GREY COUNTY

H. C. Duff:—

I have been in communication with the principals of the high schools throughout the county from whom I have learned that upwards of three hundred high school pupils are doing their part towards increasing farm production. Public schools pupils are also helping. I have assisted the chairman of the Resources Committee of Owen Sound in organizing similar committees in all the towns and villages of the county.

LAMBTON COUNTY

W. P. Macdonald:—

We unloaded and set in motion the farm tractor supplied through the Department. The farmers and townspeople are taking a great interest in this machine.

DUNDAS COUNTY

E. P. Bradt:—

We have completed the distribution of seed and eggs to the schools. I conducted a lime-sulphur making demonstration where an apparatus was in use whereby four barrels could be boiled at the same time. Many fruit growers find it profitable to make their own lime-sulphur. By means of these demonstrations farmers learn to make up their own spraying materials.

DURHAM COUNTY

G. A. Williams:—

The seed of oats, barley and potatoes have been given out for school fair purposes, all of which has been treated with formalin.

GRENVILLE COUNTY

J. E. McRostie:—

We have placed twenty pounds of Yellow Intermediate mangel seed with ten experimenters in order to test the relative value of home grown and imported seed. We have received two thousand trees from the Forestry Branch and have set them out in blow sand areas. Part of these are in the place of last year's planting that died and the rest to cover new areas. We held a demonstration in the use of farm stump-ping powder. Several stumps, stones and trees were blown out so clean that it was a marvel to those present.

SIMCOE COUNTY

F. A. Wiggins:—

The Town Council in co-operation with the Board of Trade of Orillia have arranged to have sixty lots ploughed for the use of the Soldiers' Wives League. Potato seed is being supplied. I have undertaken to take charge of a scheme organized by the Board of Trade of Collingwood in awarding prizes to school children in gardening.

WELLAND COUNTY

E. K. Hampson:—

I have assisted the Thorold Production League and the Red Cross Society in getting vacant land into cultivation. Potatoes and beans are being planted. The members of the Daughters of the Empire cut the potatoes and the boys of the high school did the planting. We are purchasing manure and securing wood ashes for the plots.

RENFREW COUNTY

M. H. Winter:—

The Renfrew Home Gardens Association at a meeting held in my office, arranged to secure and prepare land for those desiring to use it. Several citizens of Renfrew and myself are growing potatoes, beans and similar crops on land about three miles from town. The treatment of seed grain for smut has been generally practised. We have prepared instructions for the treatment and sent to the local papers and have supplied all the druggists in the county with sheets of instructions in the use of formalin. The tractor supplied by the Department is doing excellent work in ploughing and otherwise cultivating the ground.

BRANT COUNTY

R. Schuyler:—

We now have two tractors in operation in the county. The machines are doing excellent work.

MUSKOKA AND PARRY SOUND

F. C. Paterson:—

I have answered many inquiries from farmers in regard to the loan which is granted for the purpose of buying seed. A number have taken advantage of this plan.

LANARK COUNTY

F. Forsythe:—

My time has been greatly in demand by the Perth Production League. We have secured several fields in the vicinity of Perth for the growing of garden vegetables. The land has been eagerly taken up as rapidly as it was made available.

HALTON COUNTY

W. F. Strong:—

I have given my assistance in the organizing of Resources Committees in the towns of Oakville, Burlington and Milton. The Oakville Committee have had one hundred acres of land given them. It is their intention to purchase a tractor and put the land into crops. I have ordered a carload of seed potatoes for the Burlington committee. I have given a good deal of time in getting the tractor in operation.

PEEL COUNTY

J. W. Stark:—

The alfalfa plots that were planted under the supervision of the District Representative have come through the winter in good condition. These plots were grown from seed of the Grimm variety supplied by the Ontario Agricultural College and sown in rows at the rate of three pounds to the acre. In comparison with alfalfa of other varieties, the Grimm alfalfa appeared to advantage.

RAINY RIVER

R. E. Cumming:—

We held a meeting of the LeVallee School Fair Association. The representatives from the various schools are very enthusiastic about the work. The council of this municipality have granted sufficient funds for the prize list of our next fair.

MANITOBA

CONDITION OF BEES

MR. R. R. Muckle, Provincial Apiarist, has received reports of the condition of colonies from a large number of bee-

keepers throughout the province. These show an average loss of about eight per cent of the colonies put away last fall.

DEMONSTRATION PLOUGHING MATCH

THE Extension Department of the Manitoba Agricultural College is responding to the requests of a number of agricultural societies who wish to hold ploughing matches, in placing at their disposal the services of Mr. F. F. Parkinson

to give a ploughing match demonstration prior to the time of holding the regular match. Mr. Parkinson will demonstrate and describe what goes to make up a successful ploughing match.

FURTHER PARTICULARS OF GOPHER WEEK

IN the last or June number of THE AGRICULTURAL GAZETTE, page 487, some particulars are given relative to the early days of gopher

week, the date of which was the first week in May. Further information as to the success scored shows that the total result of all the contests

was 100,000 gopher tails. which means that about one-tenth of all the gophers in the province have been destroyed and that the little pests have received the worst blow that has yet been chronicled. As they were killed in the breeding season, the result is equivalent to a million slain in midsummer. Part of the crusade was educational and 156 essays on "How Gophers Live," with photographs and drawings, were sent in.



GOPHER WEEK IN MANITOBA
Scores made by two girls of Glenboro School

The manufacturers of gopher poison awarded prizes to the pupils sending in the best essays on the efficiency of gopher poison. One boy claimed to have got 1082 gophers with a single package of poison. Every means of getting the gopher was brought into play, trapping and

drowning being the favourite methods in the school contests. It is proposed to repeat the event next year.

As stated in the June GAZETTE two school-girls of Glenboro shot 141 and 132 respectively on one day.

SASKATCHEWAN

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE

BY W. L. H. STOKES, EDITOR "THE PUBLIC SERVICE MONTHLY"

CO-OPERATIVE TRADING

CO-OPERATIVE trading in this province has made a gratifying growth from year to year since the inauguration of the movement. Upwards of 350 co-operative trading associations have been registered under The Agricultural Co-operative Association Act of Saskatchewan since it was passed in

December, 1913. This means that associations have been organized at an average rate of two per week throughout the past three years. The great majority of these organizations are carrying on highly satisfactory business. The following table shows the progress made:

	1914	1915	1916
Associations reporting.	102	173	309
Number of Shareholders	2,850	5,537	9,444
Paid-up Capital	\$ 13,494 20	\$ 39,421 49	\$ 92,940 27
Assets	37,337 53	105,322 37	295,012 40
Liabilities including Paid-up Capital	29,717 33	82,956 57	232,938 81
Number of Associations handling Supplies	70	138	308
Value of Supplies Handled	239,320 42	805,456 88	1,784,545 85
Number of Associations Marketing Live Stock	9	10	33
Number of Cars Handled	30	140	241
Value of Live Stock Handled	42,034 22	150,512 76	323,171 25
Value of other Farm Produce Marketed.	No Report	8,923 03	15,115 80
Total Turnover	281,354 64	964,892 67	2,122,832 90
Net Profit	No Report	19,102 27	54,076 82

TESTING SEED FOR GERMINATION

The Weeds and Seed Branch of the Saskatchewan Department of Agriculture has compiled the records of the seed testing which was carried on during the past winter for the benefit of farmers throughout the province.

Of 681 samples of wheat tested, 450 germinated over 80 per cent, and

540 germinated over 70 per cent. This is a lower percentage than in either 1915 or 1916.

Of 880 samples of oats tested, 360 germinated over 80 per cent, and 535 germinated over 70 per cent. This also is considerably lower than in either of the two preceding years.

Eighty-three samples of barley were tested. Of these, 35 germinated over 80 per cent, 44 over 70 per cent, 53 over 60 per cent.

Of the 22 samples of flax tested, 18 germinated over 70 per cent.

A fairly large percentage of all samples of grain sent in came direct from the threshing machine. The

most common weed seeds to be found in the wheat samples were Wild Oats, Cockles, Blue Burr, and the Wild, Ball, Hare's Ear and Tumbling Mustards.

A total of 1,716 samples were tested, this being nearly twice as many as in 1916, but only half as many as in 1915.

GOPHER DAY

The campaign against the gophers instituted by the Weeds and Seed Branch of the Saskatchewan Department of Agriculture was entirely successful. Nine hundred and eighty schools competed, and a total of 514,140 gophers were killed, or an average of 524 per school. It has been estimated that each gopher consumes 25 cents worth of grain in a season, so that this means that \$128,535 worth of grain has been saved, a result which is a handsome return for the work involved. It has never been definitely established whether or not there are two broods of gophers in the same season, but even allowing for an increase of six, the destruction of the above

number of gophers at this time of year means that three times as many have been eliminated, and three times the amount of grain has been saved, with an actual cash value of \$385,605.

The silver-plated shield offered for the school getting the highest number of gophers was won by Gutenberg S. D., No. 2,327, with 7,632 gophers. The gold watch for the individual killing the largest number was won by Master Christian Reiter, 13 years old, of the same school, who accounted for 2,092. Amongst the individual winners of prizes were several girls, one of whom killed no less than 981.

ALBERTA

THE HANDLING OF MANURE ON THE DEMONSTRATION FARMS

BY S. G. CARLYLE, B.S.A., SUPERINTENDENT, DEMONSTRATION FARMS

THE disposition of barnyard manure has not yet become a serious problem to the farmers of Alberta. The soil still has more than enough nitrogen, phosphorous, potassium and organic matter to grow maximum crops. If there is normal precipitation, and the crop is planted early, heavy yields are almost assured.

Nevertheless, it is common knowledge that this condition cannot continue indefinitely. Some time in the future, the soil will fail to

respond, due first, no doubt, to the exhaustion of organic matter and then farmers will be unable to restore this material in time to avoid financial loss.

To meet this situation, the Demonstration Farms are endeavouring to learn how and where the barnyard manure should be applied. These farms are located in seven parts of the province and represent fairly satisfactorily, therefore, the varied soil and climatic conditions. These conditions are scarcely appre-

ciated by those not familiar with this province and settlers who change from one district to another, or who plan their operations in accordance with that followed elsewhere, frequently make bad mistakes and lose considerable money.

The place on the farm where the manure is applied depends largely upon the rotation, and rotations are either very vague or entirely absent on the great majority of Alberta farms. The Demonstration Farms, however, are at work attempting to learn what rotations are best suited to the various districts and the information which follows explains where the manure is used in these rotations:—

At Medicine Hat, a two-year rotation is followed: summerfallow and grain, though in wet years, green feed may be put in after the grain. The manure is spread in the winter on the stubble, and part of the land is summerfallowed the next year and a portion planted to corn and roots.

At Claresholm, a three-year rotation is followed: grain, grain and green feed, corn and roots and sum-

merfallow. The manure is spread in the winter on the stubble and the land is planted to corn. The manure is also applied where rye is to be sown.

At Sedgewick and Vermilion, a three-year rotation is followed: grain, grain and green feed, grass (two years), corn, roots and rye. Part of the green feed area is manured in the winter and planted next season with corn and rye.

At the Olds farm, the manure is spread on the gumbo and alkali spots, which have been greatly improved. The other parts of the farm are already very rich in nitrogen, and any further addition merely delays the maturity of the crops, and thus exposes them to the danger of frost.

At Athabasca, one-sixth of the farm is summerfallowed. The manure is applied on the summerfallow and grain is planted the next spring.

At all the farms, the manure is hauled out daily, except during seeding, when the teams are too busy to be taken from the fields.

A RETURNED SOLDIERS' AGRICULTURAL COURSE

BY W. J. ELLIOTT, B.S.A., PRINCIPAL, SCHOOL OF AGRICULTURE, OLDS

IN the first place we would like to state that the work undertaken at the Olds School of Agriculture is not connected with the Dominion Government's Land Settlement Scheme.

We appreciate the fact that the soldiers who come to us wish to receive as much practical information as it is possible for us to give in the short ten months' course; consequently, the work as it has been outlined is as practical as can be. That is, the soldiers actually undertake the cultivation of vegetables, the raising of poultry, the feeding of hogs, the manufacture of butter and cheese, etc. For this purpose a one-twentieth part of an acre is set aside

for each veteran. He seeds this area, looks after it himself and all he makes is for his own personal use. In addition to this an acre of ground is set aside for the whole group of students. They may plant this to potatoes, roots, or whatever they may desire and the results from this, after deducting the cost of the seed, will be turned in to the veterans' general fund. It will, of course, be remembered that this general fund is a personal fund belonging to the soldiers themselves.

PLOTS OF GRAIN

The School of Agriculture also has under experiment some two hundred

and fifty plots of grains, grasses, roots, etc. These various plots are grown so that the students may see the actual results obtained from the growing of most of the common varieties of seeds that we may have to deal with. The study of these plots will give an individual a splendid idea of what crops may be grown successfully and as to what crops should be avoided.

Another branch of the work is taken up under the heading of poultry. Approximately eight hundred eggs have been furnished the soldiers by the School of Agriculture. Four large incubators are under way and the soldiers receive the experience of handling incubators and the raising of chickens. In the fall the chickens that have been raised will be fattened and sold and after the cost of the eggs has been deducted the surplus will go into the coffers of the veterans' agricultural club. For the handling of the large number of chicks the Government has furnished the lumber and the veterans are building their own poultry houses.

It will thus be seen that the work is made as thoroughly practical as can be and the soldiers have been given a financial interest in the work, which keeps every one intensely interested.

LECTURES TO BE GIVEN

Of course it will be remembered that there will be some rainy days and days when it is not actually necessary to do general work in any of the departments. For these days lectures are given dealing with the various phases of agricultural work. Needless to say these lectures follow out very definitely the programme of work that has been laid down for the summer. Special lecturers come from the Department of Agriculture

from time to time to give work along the lines of poultry keeping and also along the lines of the veterinary side of the work, which takes up the common farm diseases and how to handle them.

Practical work is also given in milk testing, butter and cheese making.

PRACTICAL INSTRUCTION

The work as it has been outlined above deals practically with the land set apart for the use of the School of Agriculture. It will be remembered that this area of land is situated on the corner of the Provincial Government Demonstration Farm. This is a farm of some three hundred and twenty acres, which is being run as any ordinary commercial farm. Thus by keeping in touch with the work done with the dairy herd, the farm machinery and with the various operations that are carried on the veterans secure a good idea of how to handle the general operations of a farm.

The whole scheme is laid down so that the soldiers may get as practical a course as possible.

EARNESTNESS OF THE MEN

We would just like to add a word in appreciation of the earnestness and adaptability of the veterans who have come to the School of Agriculture to take this course. All the men are eager for the work and take an intense interest in everything that is going on.

It might be added that there are no fees or dues of any kind in connection with the agricultural course at Olds. All instruction is given entirely free. The soldiers receive from the Government \$30 per month with which to pay their board, lodging and laundry, and in addition \$8 for clothes, etc.

PART III

Rural Science

SUMMER SCHOOLS FOR TEACHERS

Summer schools for teachers will be held in most of the provinces of Canada during July and August. In the studies to be taken up, elementary agriculture will occupy a prominent position. The following statements are taken from correspondence and official announcements issued by the Departments of Education of the different provinces:

PRINCE EDWARD ISLAND

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

WE have not been able to arrange for the summer school for teachers this year. The labour problem of the province appeared to be approaching a critical stage during the early part of the season, and the Government has seen fit to make it optional with the schools as to whether they have holi-

days at the usual time or in the spring and fall, as was the usual custom. This arrangement only applies for the present season, and we hope to be able to continue our summer school in the future as in previous years, adopting at the same time a more permanent form than has hitherto been employed.

NOVA SCOTIA

A rural science training school for teachers will be held at Truro, from July 11th to August 9th. The curriculum of studies is pursued at the Provincial Normal and Agricultural Colleges through one, two, or three terms of about four weeks each; and, at successive stages in the completion of the same, the student may be granted a certificate qualifying him for a special grant. On the completion of the course, the candidate is granted a rural science diploma.

The arrangements herewith described, however, are made for a continuous course of training for Normal students leading to a rural science diploma. Graduate and undergraduate students of the "B" and "A" classes of the Normal College, possessed of exceptional general ability, of previous knowledge of the natural sciences, and of aptitude for science teaching, may at the beginning of

April enroll as candidates for the rural science diploma as well as for the diploma of the Normal College. Such undergraduate candidates are released from their regular studies in the Normal College and are permitted to devote themselves to the work of the rural science school, remaining in attendance until the closing of its classes in August, at which time they may hope to be awarded the full diploma in rural science.

The teaching staff comprises the several science-teachers of the Provincial Normal and Agricultural Colleges; and the laboratories and other equipments of the two provincial institutions at Truro are placed at the disposal of the faculty and students. Tuition is free. Students who have done satisfactory work for the full term in at least two scientific subjects are recouped the amount of their actual travelling expenses.

Teachers who have been regularly admitted to the Rural Science Training School, and have, during any summer session, done satisfactory work in at least three scientific subjects may, at the end of the session, be granted cash scholarships of \$10, \$15, or \$20, according to the quality of work done. The class standing and final examinations decide the amount of each scholarship.

Rural science teachers who, in connection with their regular teaching duties do noteworthy work in gardening or exhibitions, may be awarded cash prizes varying from \$5 to \$25, according to the quality of such special work.

The following classes are offered at the rural science school for teachers seeking a rural science diploma

and for those who desire to improve their knowledge in natural science:

(1) Nature Study; (2) Botany; (3) Biology; (4) Chemistry; (5) Physics; (6) Geology and Mineralogy; (7) Plant Diseases; (8) Entomology; (9) Horticulture; (10) Agriculture; (11) Bird Study; (12) Weather Work; (13) Wood Work; (14) Brush and Cardboard Work; (15) Bacteriology.

For a rural science diploma classes (1) to (3) inclusive are compulsory. In addition to these the candidate must have successfully completed the work of four classes selected from (4) to (15) and must have presented more advanced work in at least two of these during a second term. The classes in which advanced work for a second term is provided are (4) to (9) inclusive.

NEW BRUNSWICK

Two Rural Science Schools will be held in New Brunswick this summer (July 10-August 10), one at the Fisher Vocational School, Woodstock, and one at the Agricultural School Building, Sussex.

Method of teaching and place of the nature study and agricultural subjects in the public school course.

Addresses by specialists dealing with the natural resources of the province in their relation to education will be delivered from time to time during the session.

COURSES OF STUDY

1. Nature study with special relation to insects, birds, fish and other animals, 2, Physical nature and environment (soil water, air, weather, fertilizers tools and machines, sanitation, etc.) 3, Chemistry of soil, plants and animals. 4, School gardening and plant propagation. 5,

It is also proposed to have short courses in drying fruits and canning and preserving vegetables and fruits, also instruction in the profitable use of left overs and elimination of waste food and energy.

QUEBEC

MACDONALD COLLEGE

A summer school for teachers will be held at Macdonald College from July 23rd to August 18th. The course will include nature study, elementary agriculture, drawing and school music. On being awarded a certificate for the successful completion of the work, each student will be paid the sum of 5c, for each mile that the

home of the student in the province of Quebec is distance from St. Anne de Bellevue. A bonus of \$15 will also be paid to each student who completes the course and obtains this certificate. A nature study and elementary agriculture certificate will be awarded to those students who complete the course satisfactorily.

ONTARIO

AMONG the summer courses for teachers that will be held in Ontario by the Department of Education from July 3rd to August 3rd, will be the usual course at the Ontario Agricultural College leading to the following certificates:

- (a) In Elementary Agriculture and Horticulture.
- (b) Intermediate certificates in Agriculture.
- (c) Certificates in Agriculture for teachers of Household Science.
- (d) Certificates in Farm Mechanics.

Following are the qualifications for admission to the different courses:

For the Intermediate certificates in agriculture—

- (a) To the course for the Intermediate Certificate in Agriculture may be admitted applicants who hold professional certificates qualifying them to teach in high or continuation schools and whose academic pre-

paration has fitted them to teach science therein.

For the certificate in agriculture for teachers of household science—

- (b) To the special course in agriculture may be admitted teachers who hold at least ordinary certificates in household science.

For the certificate in farm mechanics—

- (c) To the special course in Farm Mechanics may be admitted teachers who hold or are in course of preparation for an Intermediate Certificate in Agriculture.

The actual travelling expenses of the teachers in attendance will be allowed, in addition to \$25 for the cost of board and lodging during the preceding summer session, provided the teacher completes the summer course leading to a certificate in agriculture and has given satisfactory instruction in agriculture during the past school year.

SASKATCHEWAN

A summer school for teachers will be held at the University of Saskatchewan from July 3rd to August 10th. The courses will include agriculture, household science, elementary science, manual training and art. Each course will consist of two summer sessions, to be designated as the first and second years of the course. The work of the first year is designed to lay a basis for the work of the above courses. The work of the second year is devoted to the special course selected and an additional week for practical work in school gardening and nature

study, provided the same has not already been taken. Teachers who have completed the work of the first year, except in practical work, in nature study and school gardening, will be admitted to the second year in any course, but must take these subjects during the second year. A fee of \$1.50 is required in each year to cover general expenses. The Department of Education will pay the return railway fare of those teachers who satisfactorily complete the summer's work as prescribed for a course leading to a diploma.

ALBERTA

THE fifth annual summer school for teachers will be held this year from July 3rd to August 4th. In 1913, the first year, the

attendance was 75, in 1914 it was 155, in 1915, 310, and in 1916, 320. Up to this year 475 teachers have taken one or more of the courses in agri-

culture and gardening, 300 one or more of the courses in nature study and 137 in household science. Fifteen other subjects attracted an average of 80 teachers each.

Special grants are provided by the Department of Education for the encouragement of instruction in special subjects. To qualify for these grants the teacher must hold the special elementary certificate in the subject.

Only those teachers who hold at least a second-class interim certificate and upon whose work in the field the inspector has given a favourable report will be admitted to the summer school courses. The transportation to and from the summer school is paid by the Government and arrangements have been made with the university for board and room at reasonable rates. Ample provision will be made for recreation, especially in the form of tennis, baseball, football, basketball and bowls.

The Department of Education has provided a special course of five weeks at one of the Provincial Normal Schools for certificated British teachers and teachers from the United States who hold certificates of sufficiently high grade to be acceptable to the Department. This course was formerly given in January and February of each year, but, in order to make it possible for candidates to attend without breaking into their year's work in the schools, the Department decided to change it

to the summer course. The course is designed to prepare such teachers for service in the schools of the province.

The summer course staff is an extensive one, including upwards of forty leading educationists in the various studies included in the curriculum.

To obtain a certificate in elementary science courses must be completed in agriculture including the study of plants, soils, farm animals and poultry, with the addition of ranching in the second summer; and in nature study, comprising lectures, laboratory work, field work and expressive work. Students are also required to complete satisfactorily a reading course during the period intervening between their first and their second summer's attendance.

For a certificate in elementary household arts, courses must be completed in sewing and designing, as well as in household science, dietetics and household management.

Certificates are also given for first aid and home nursing. A special course of instruction is given for high school teachers in science and agriculture, including studies of economic plants, farm animals, plot work, agricultural chemistry, soil physics, agricultural bacteriology, field crops, experimental plots, farm animals, and economic entomology; also methods in botany and zoology.

BRITISH COLUMBIA

SUMMER courses of instruction for teachers have been arranged by the Department of Education to be held at Victoria from July 3rd to August 3rd. The following courses will be provided:

(1) Rural Science (including Elementary Agriculture, Nature-study, School Gardening and Forestry)—

(a) A preliminary course.

(b) An advanced course open to those who complete the preliminary course in 1914 or 1915, or who have been admitted as having equivalent standing.

(2) Art—

(a) A preliminary course.

(b) An advanced course open to those who obtained first-class standing at the summer school of 1914 or 1915, or who have been granted equivalent standing.

- (3) Manual Training—
 - (a) Manual Arts, Primary and Intermediate:
 - (b) Wood and Metal Work, for men and women.
 - (c) Wood and Metal Work, for men only.
- (4) Household Economics—
 - (a) A preliminary course.
 - (b) An advanced course open to those who completed the preliminary course in 1914 or 1915, or who have been granted equivalent standing.
- (5) Vocal Music and Elocution.

Last year on account of great stress and financial depression the summer school was omitted. This year the school is made possible only by the exercise of practical economics. Teachers are, therefore, required to meet their own living expenses while attending the summer school. Free tuition, as well as transportation expenses to and from Victoria, is provided by the Department of Education.

THE PACKAGE LIBRARY

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., SECRETARY FOR AGRICULTURE

IN connection with the Women's Institutes of the province of Nova Scotia, our Department of Agriculture has made arrangements with McGill University Travelling Library Department by which we pay the subscription on behalf of the Women's Institutes in our province ordering a library from

this source. About twenty per cent of the institutes have taken advantage of this arrangement, but in many communities in the province there are other sources of access to books, libraries, etc., which make any provision by the Department of Agriculture unnecessary.

MACDONALD INSTITUTE, GUELPH

BY MISS M. U. WATSON, DIRECTOR

MACDONALD Institute has a library of books and magazines, bulletins and pamphlets bearing especially upon Home Economics, and is constantly adding to it.

The Home Economics Department has always been interested in the Women's Institutes, and annually invites their members to seek our help along our line of work. By 1908 it had become apparent that members living far from towns had few resources in the way of home economics literature, and would gladly borrow from our library when they had a paper or talk to prepare for the monthly meeting, or a knotty household problem to solve. Accordingly,

at the Women's Institute convention of 1908, Macdonald Institute formally invited the members to borrow home economics literature and began its loan work. Later Mr. G. A. Putnam circularized all the branches to the same effect, and later the invitation was widened to include anyone who thought our service worth asking.

Book post is expensive,¹ especially when a single page of a heavy book gives the information, or when one book does not cover the ground. We, therefore, turned to our rapidly growing collection of unbound bulletins, pamphlets and magazines, and by degrees got it into mailing shape. This necessitated tearing up maga-

zines, etc., to separate the articles worth preserving for our purpose; putting each into a numbered folder, and writing a descriptive catalogue card for each. Beginning with about 1500 of these folders in 1909, we now have over 5000, which are periodically checked over, weeded out and renewed. These form the chief part of our loan stock, but we frequently send books and special letters.

We set up a simple circulating system, and still find it an easy matter to answer requests for help, with

packages rapidly selected, sent out, and kept track of. Along with each package but under a separate cover goes a printed form letter, which bears on the back of it a clear description of the assistance Macdonald Institute offers, and directions for the borrower.

Many appreciative letters are returned with the packages, so that we feel the work has been worth while.

Following is a table giving statistics of the work to date:—

REQUESTS FOR ASSISTANCE

	1908 to 1910	'11	'12	'13	'14	'15	'16
Topics:—							
Home or Family.....	46	69	63	101	99	96	
House or Housekeeping.....	109	48	87	105	117	48	
Cookery and Foods.....	179	155	168	156	125	80	
Dietetics.....	16	34	19	14	15	13	
Health.....	42	43	33	48	57	43	
Household Finance.....	23	11	10	31	30	31	
Home Econ. Education.....	42	12	45	33	44	43	
Social Service, Clubs, etc.....	101	161	192	193	176	116	
Gardening and Agriculture.....	15	14	11	26	35	18	
Patriotic.....					23	16	
Miscellaneous.....	33	94	57	37	22	13	
Total.....	360	606	641	685	744	743	517
Requests were answered with:							
Folders containing magazine articles, bulletins, pamphlets or clippings.....	2137	1860	2396	2438	2130	1849	
Books.....	121	53	90	103	50	44	
Letters of advice or information.....	7	55	141	24	6	5	
Letters regretting lack of material, or material already out on loan.....	42	37	55	104	32	51	
Replies from other college departments.....	10	18	16	22	23	16	

MANITOBA

BY MARY G. WOOD, LIBRARIAN

THE Package Library which we have been making use of for some time in connection with the Home Economics societies of this province, originated in a large quantity of farming papers, both American and Canadian, which had accumulated in our library during the past five or six years. As there were no indices to most of these, the con-

tents were practically dead material, however valuable they might be. There were also included a large number of duplicates of magazines which we bind up yearly, as well as of bulletins from the Dominion Department of Agriculture, the U. S. Department of Agriculture, and the various States. As most of this material was usable, it was suggested

that cuttings should be made from all the magazines, and that these, together with the bulletins, and new material which could be constantly added, should be made up into packages, and sent out to anyone in the province who was in need of information.

An employee of the college was engaged during the summer months in making the cuttings from the periodicals and filing them.

The library has been advertised in the papers of the province through the medium of the Publications Branch of the Department of Agriculture. There was a demand for the packages immediately, but not a large one. We sent out twenty-five packages the first month, and, since then, three or four each week.

As regards the actual working of the library; the cuttings from magazines which are sent out are not sent loose, but in order to make them more permanent they are pasted up on manilla sheets. In this way quite small cuttings can be utilized, if sufficiently valuable. Articles consisting of several small pages are fastened into a cover and labelled. The collection is then put together into a folder printed with the College address and directions for obtaining and returning the packages. A return envelope is enclosed.

The cuttings are not permanently catalogued, but a list of the contents of each package is sent to the borrower to ensure the same being returned, and a carbon copy of this list is filed, to be kept indefinitely so that we may know what topics are in most demand. In the case of the cuttings, the list gives the number of sheets sent only; but a record of the number and source of the bulletin is kept, so that these can be replaced if lost.

As we have a great quantity of cuttings, we find it best not to have these pasted up in advance, but to await requests and then select cuttings accordingly. In this way labour is economized in work upon material

which may not be called for, or only some time ahead when there may be newer material to send out.

We are now obtaining extra copies of special farming papers, and these are being cut so that there may be up-to-date material.

In making up the packages an endeavour is made to provide as much all-round information as possible on the topic asked for, while not making a too bulky package. When two or three topics are asked for at once, as has happened frequently, the information is sent, whenever available, but less reading is sent on each topic.

The packages are available to anyone in the province.

They may be kept for two weeks at a time, and may be renewed once for the same period, if desired.

The outward postage is paid by the College, the return postage by the borrower.

Books are not included in the library.

All the literature in these packages is returned to the College, with the exception of bulletins and other publications from Manitoba Agricultural College.

The demand for the packages can probably be kept up by further advertising, but we feel that it is still early to regard this library as sure of great success, at least until it has been working for a year. As soon as further material has been accumulated, especially in the form of bulletins, so that the supply may be equal to any probable demand, a circular will be printed which can be enclosed in mail going out from the College. It is also expected that when students go out from the College and have been informed of the library, that calls will come through them. Incidentally, it is proving helpful to the students here at present who are making some use of the cuttings.

The list of topics on which literature is available in packages is herewith appended:

AGRICULTURAL TOPICS

Agricultural credit; agricultural education; alfalfa; barns and stables; bees; birds; botany; boys' and girls' clubs; dairy cattle; dual-purpose cattle; cleaning of land; clover; community life; concrete; co-operation; corn; country life; country schools; cold storage; dairy; district representatives; dry farming; drainage; eggs; electricity on the farm; ensilage; farmers' clubs; farm management; feed and feeding stuffs; fertilizers and manures; flies; flax; grasses; health—personal and public; heating; home grounds; horses; house plans; insects; irrigation; labour; lighting; marketing; mixed farming; meat on the farm; mosquitoes; packing for shipment; paint on the farm; potatoes; poultry; rats; roots; rotation of crops; roads; sanitation; school gardens; sheep; silos; seeds—selection and testing; sewage; veterinary medicine; weeds; waste products of the farm; wheat—free wheat; water supply on the farm.

HOME TOPICS

Boys:—Boys' and girls' clubs; bread and bread-making; butter-making; cake mak-

ing; candy recipes; canning and preserving of fruit and vegetables; cereal breakfast foods; cheesemaking and cooking; children, care, management, and training; Christmas ideas; cold storage; confectionery and beverages; cookery, methods and recipes; cost of living; country church; country life; country schools; desserts; domestic science; dress; dressmaking; drugs; eggs, cooking and preserving; entertainments; farmhouses and buildings; farm life; farm sanitation; fireless cookery; flies, danger and control of; food and diet; fruit; gardening.

Girls:—Home training; home nursing; household conveniences; household efficiency; household hints; household pests; house plans; house cleaning; house furnishing and decoration; health, personal and public; infants, feeding and care; kitchen, planning and equipment; labour-saving devices; laundry and dry cleaning; meat on the farm; menus; milk; mothercraft; poultry-keeping; salads; school lunches; table setting and serving; vegetables, value, cookery, canning; vegetarian diet; water supply on the farm; women's clubs.

THE INSPECTOR AND RURAL SCIENCE

BY J. H. HUNTER, M.A., B. PAED., INSPECTOR OF SCHOOLS, COATICOOK, QUE

RURAL life is now coming to its own. Rural citizens are finding themselves. Thanks to the awakening of the inventive, investigating and discovering spirits of modern days for the new era in rural life.

The consequent awakening of rural life to its possibilities is the economic salvation of the nations.

One great agency through which rural life is to continue treatise best is the modernised rural school. It is true there were many famous rural and urban schools in the past manned by skilled teachers, but the tend of the curriculum of the schools was too largely professional, so that to the rural youth there came the impression that the professions and the mercantile occupations were those that were dignified, refined, cleanly and cultural.

EMANCIPATION OF RURAL LIFE

In all the years of my rural life, I recall but one utterance made by a teacher that commented favourably upon rural life. The fields, the flowers, the fruits, the feathered kind, the farm-life, the farmer, the farmer's family were all ignored or else forgotten, because of the lure of the professions and the urban life.

But what a deliverance has come to rural life since the latter has become scientific—deliverance from the guess-work of past actual farming, from the witchcraft and moonshine beliefs so long prevelant as to dates and methods of seeding and planting, from the too-ofit urban contempt for the rustic, from the lurking or else open self-contempt of the rural citizen for himself, because only "fit to be a barnyard clerk," from the too common rural disorderliness of dress and

unkemptness of person and a seeming pride in the same, from the false and stupid belief that "any meagre education is good enough for a farmer."

Rural Science then is a comprehensive term and includes agricultural, domestic, literary and social phases, all of which phases treated from a scientific basis are wide in operations and far-reaching in results.

The rural school is now becoming one of the greatest agencies, if not the greatest agency, whereby each and all of the phases mentioned are to become operative and realisable.

The trained and efficient teachers will have their honourable part in modernising and transforming rural life by their fidelity in carrying out the interesting and varied school curriculum.

POSITION OF THE INSPECTOR

But the inspector because of his office has a unique duty and opportunity at the present time

It is presumed, at the outset, that the inspector is conversant with rural life and, because of early rural relations, readily perceives the advantages and readily responds to the appeals of such life.

The inspector has official relations with the Department of Instruction, with school boards, with teachers and with pupils. It is reasonable to suppose that he can give exact information to the Department relative to the varied phases of rural life, that he can suggest where the broadening of the school-curriculum is essential, where further expenditure could be suitably made, where greater emphasis should be laid in the school course.

The inspector's influence on school boards is an uncertain quantity sometimes. Where the district board still obtains instead of the township or county board it is extremely difficult for an inspector to bring about co-operation on important matters, such as consolidation of

schools, etc. But where the board is of township or county organization and is composed of progressive men, the inspector has certainly in such board a body of men from whom he may expect sympathy and co-operation in his endeavour to have realised to rural communities the economic and pleasurable worth of rural science in all its phases.

In days of yore, it was too often too true that the inspector's visits were dreaded by the pupils. But as a rule the inspector of modern days does not enter the school-room with the austerity of an over-lord, or the glumness of a cynic. Because of the changed attitude, because of the genuine teacher-sympathy for the pupils, on the inspector's part, he has the opportunity during his visits of getting very close to the hearts of pupils. By his sympathetic yet comprehensive thorough examinations upon subjects that particularly touch rural life, he will enhance their value in the pupils' minds and help them to believe that rural life is not undignified, boorish, illiterate, but worthful, cultured, scientific.

INFLUENCE OF THE INSPECTOR

All good teachers are enthusiasts in their art and in this day of broadened vision as to rural life, they will not be found limited as to viewpoint. But there is no doubt that the enthusiasm of the rural inspector for progressive rural life and his insistence that true emphasis be laid upon the various phases of rural science in rural schools will be constant stimulus to rural teachers to measure up to their opportunity and duty.

There is, however, a constituency with which the inspector is not officially connected, and yet a constituency with which he ought to be more closely identified—the public or rate-paying body. Officially he is not liable to the public, nor does he necessarily come into close grips with such, but it may be asked if the day

has not dawned when his influence should be more definitely, practically and intensely felt by the public.

The effective application of rural science, through the schools, upon the communal life must have the sympathy and co-operation of the constituency called the rate-paying body.

AIMS OF RURAL SCIENCE

The end of rural science is not only to have certain subjects related to rural life taught in the schools, but to have the rural school become an impression upon, and an expression of, the communal life. This means that the school is to become the community centre which will generate a community sentiment, a rural *esprit de corps*.

In order to this end there is need of educational agitation, educational conferences, and meetings where the benefits of the larger rural life may

be urged and extolled.

Since the inspector is expected to be conversant with rural affairs is it not reasonable to expect that he as a disinterested, yet interested, party could aid much towards the desired end by conducting many such meetings each year within his inspectorate?

Since the Dominion Government has allotted to each province a generous grant to be devoted each year towards agricultural education, would it not be a serviceable act if the provincial legislatures could see their way clear to grant generous allowances to inspectors, with a view to conducting educational campaigns each year throughout their inspectorates?

This done, the end so devoutly to be wished would the sooner be realised, and there be ushered in the sooner the perfect day of Rural Science.

NEW BRUNSWICK

VACATION CARE OF SCHOOL GARDENS

IT is realized that school garden work to be satisfactory cannot be neglected during the vacation period. In order to ensure the gardens being taken care of during the holiday season they will be regularly visited by supervisors. Every teacher in charge of such a garden is asked to make definite

plans for local care. Pupils are expected to look after their own plots in the garden. The teachers are required to indicate on the agricultural instruction returns made to the Department immediately after the close of the term, the plans that have been made with the pupils endorsed by the trustees.

A BIRD HOUSE FAIR

A Bird House Fair was held in the Provincial Normal School for New Brunswick, on Arbour Day, May 11th. It was the first one of the kind in the history of the institution.

There were four classes of exhibits:—1. Martin house; 2. Bird houses made by male students; 3. Bird houses made by female students; 4. Bird house made by Model School pupils. There were seven prizes in

each class, the funds having been supplied by the Minister of Agriculture.

Mr. L. S. McLaine of the Dominion Entomological Staff, Mr. Wm. H. Moore of Scotch Lake and Mr. R. P. Gorham of the Dominion Experimental Station, were the judges.

From the sale of bird houses and from other sources, one hundred and sixty dollars were received, to be devoted to patriotic purposes.

SASKATCHEWAN

SCHOOL FAIR AND TEACHERS' CONVENTION

THE third annual union school fair and teachers' convention of the schools in the Yorkton Inspectorate will be held in the Simpson School, Yorkton, Thursday, Friday and Saturday, September 27, 28, 29, 1917. The two previous united school fairs and conventions

were most successful and it is confidently expected that even greater success will be achieved on this occasion. Spelling, elocution, essay writing on mixed farming, chorus singing, physical training and story-telling competitions are made features.

RURAL SCHOOL LUNCHES

BY MISS F. A. TWISS, DIRECTOR OF HOUSEHOLD SCIENCE

THE hot noon lunch has been carried on successfully in a number of rural schools in Saskatchewan and has been found to be a valuable asset. In each school, the teacher has taken the initiative, solving the problem according to the

conditions of the community. Many begin in a small way and when it is proven to be worth while the community supports it.

One teacher began by simply spreading a white table cloth, brought from her own home, on the small



SOUTH WEYBURN SCHOOL, DISTRICT 670, SASKATCHEWAN

table which served as her desk. The small group of children gathered with her around this table each day. She soon noticed a marked improvement in the lunches, both in the quality of food and in the way in which it was prepared and packed. Another teacher with the help of the only boy attending at that time, made a table out of some lumber which had been left after the school was repaired. The children brought their dishes for serving and their parents sent in food and loaned utensils for heating it.

In schools where regular equip-

ment has been placed, the waiters serving it on trays. There were fifteen children large enough to work and the teacher arranged them into five groups, each group serving in turn. Each group washes the dishes one day and the next day gets the lunch ready. Then the next group takes the duties and so on. In getting the lunch ready, two prepare the dish and the remaining one places the paper plates on the desks and assists in the serving.

In another school where an ante-room was used for the equipment, the boys put up a box and shelf to serve as a cupboard. A three-



EQUIPMENT FOR NOON LUNCHEON, SOUTH WEYBURN SCHOOL

ment has been placed, the work is more extensive. The method used in Cobourg School District 614, was described in THE AGRICULTURAL GAZETTE, Vol. 3, September, 1915. In that school the twenty-eight children sat down at two tables, as the accompanying illustrations show. Where tables are not available, the school desks may be used, spread with linen or paper table napkins and paper plates. Fig. 2 shows the equipment stored in a small ante-room. A discarded desk is used as a serving table. In Fig. 3, the pupils are being served the hot soup at

burner kerosene stove was used. Cloth covers for serving at the desks were brought from home and hemmed or hem-stitched during the sewing lessons. The children were arranged in groups of two—two girls preparing the lunch one day and two boys the next.

This work is of special value in non-English speaking communities. The teacher finds that a community of this kind needs to be shown that it is worth while. In a school of twenty-eight, of whom twenty-seven were Russian Doukhobors, the teacher went during one term with

her pupils one afternoon each month to the homes of the pupils in turn. Here she taught them to make a few simple dishes not found in their dietary. The mothers gathered also and were very interested observers and were quite anxious to learn new ways. When the food was cooked the teacher instructed the pupils in table-setting; then, all sat down to enjoy the cookery. Table manners were incidentally taught. During

eaten; no crusts are thrown away, so that there is no waste. It develops in the child a rational appetite for wholesome food, thus forming the habit of proper food selection. The child gets a certain amount of training in the source of foods, their value, and in the care and handling of food, especially in relation to the lunch box. The proper preparation of several simple dishes is learned. He is trained in table etiquette and



NOON LUNCHEON AT THE SOUTH WEYBURN SCHOOL

the following week the afternoon's work was the subject of oral and written composition. The next term, the parents were ready to put in the necessary equipment and to help to carry on the noon lunch.

The benefits resulting from the hot noon lunch are many. The hot dish increases the appetite for the cold lunch. The child eats quietly and takes time to masticate his food properly. All the lunch is

he learns consideration for others in the social co-operation which is necessary. The community is benefited also because the school and home must co-operate if the work is to be a success. Parents and teacher must meet often. There will be many social gatherings at the school-house and the lunch equipment will be used. This is an aid in making the school the "community centre."

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

MODERN PASTEURISATION AT LOW TEMPERATURE

BY J. VANDERLECK, CHEMICAL ENGINEER, LECTURER IN BACTERIOLOGY, MACDONALD COLLEGE

DURING the last eight years pasteurisation at a temperature between 140° - 145° F. with holding process has had a thorough trial on this continent. The literature on the subject is considerable, but the principal points on which the numerous investigators agree are the following:—

1. The common disease bacteria of tuberculosis, typhoid fever, scarlet fever, diphtheria, etc., are made harmless or killed when exposed in milk to a temperature of 140° F. for 20 minutes.

2. Numerous lactic acid bacteria survive this temperature; these lactic acid bacteria are necessary to check the liquefying and putrefactive species which also resist the pasteurisation.

3. Below 145° F. the food value of the milk is unimpaired and the cream line is hardly affected.

4. At a temperature of 148° F. the cream line disappears.

5. At a temperature of 158° F. 5 per cent of the albumen becomes insoluble.

6. Certain types of bacterium *coli* will survive pasteurisation.

As a result milk all over the continent is at present generally pasteurized at a temperature not surpassing 145° F. and held at the pasteurisation temperature for 20-30 minutes.

During the course of this year some municipal authorities in the district of Montreal ordered an investigation of the milk supply, and the figures obtained in the analyses of pasteurised milk were certainly very disappointing. On investigation it appeared that several firms gave the most scrupulous care to their milk all through the pasteurising process, making the poor results still more surprising. About the same time pasteurising experiments were conducted in close proximity

to the laboratory, giving ample opportunity for close observation. The results were quite in line with the results obtained in the examination of city milk, and suggested that the proper pasteurisation temperature was not such a settled matter as many people believed. All data which may have some bearing on the question are recorded in this paper. A number of pasteurising machines are mentioned, but it must be definitely understood that no conclusions should be drawn regarding the efficiency of the different types. The quality of the raw milk and the treatment of the milk before pasteurisation are such important factors that they make all comparisons impossible, unless allowance is made for them.

EXPERIMENTS WITH A SMALL PASTEURISER

In the spring of 1916 a dairy farm installed a small pasteuriser, and as it was located quite near the bacteriological laboratory a number of experiments were conducted to ascertain the best pasteurisation temperature and method under practical conditions. In this type of pasteuriser the milk is poured in a reservoir and is heated by means of hot water circulating through a spiral tube which revolves through this reservoir. After the milk has reached the desired temperature it is kept at that temperature by the insulation of the reservoir for a considerable time. To cool the milk ice water is circulated through the tube. The capacity of the stable was about 80 gallons per milking, and the milk was pasteurized after each milking. The stable conditions were good and although there was no attempt to compete with stables producing certified milk, the quality of the milk was decidedly better than any milk sold on the Island of Montreal.

TABLE I.—ANALYSES OF RAW MILK AT FARM

Date	Total number	B. coli	Acid bacteria	Liquefiers
January	3200	16	2500	40
February	3500	14	2400	35
March	4700	3	3400	—
April	9600	2	9400	—
May	23000	3	19000	—
June	38000	200	9500	?
August	4200	70	3500	—
November	8200	50	8000	—
December	12000	12	11700	450
December 15th	60000	3000	55000	1500

TABLE II. SAMPLES OF MILK READY FOR SHIPMENT

Stable	Date	Total Number	B. coli	Acid Bacteria	Liquefiers
A	June	333,000	4200	20,000	90,000
	July	310,000	6300	310,000	3,500
	October	380,000	12000	320,000	28,000
	October	2,900,000	6200	2,600,000	51,000
	November	205,000	6300	174,000	32,000
	November	24,000	250	21,000	2,400
	December	20,000	300	13,000	1,000
B	June	170,000		120,000	
	July	190,000		151,000	12,000
	October	35,000	1500	32,000	350
	October	205,000	2550	190,000	
	October	17,000		17,000	
	November	17,000	100	14,000	2,000
	November	1,100		1,350	28
Certified Milk Stable	June	416,000	380	139,000	32,000
	October	2,100	95	1,500	450
	October	25,000	15	20,000	5,000
	November	1,100		1,350	28

Table II gives a fair idea of the milk conditions in the district which supplies Montreal, and the stable (Table I) under discussion compares certainly favourably with the stables mentioned in Table II. Any conclusions which can be drawn from the pasteurisation of milk from this stable will, therefore, hold good for any milk produced in the Montreal district. On the other hand we must consider that the milk was pasteurised immediately after milking and any bacterial contamination entering this milk was not subjected to the struggle for existence which always occurs in milk received by the city dairies. In such milk bacteria have grown from 10-24 hours. Some have been influenced by the milk itself, others by other competing bacteria, and it is possible that many of the intestinal bacteria have lost much of their virulence before being exposed to the pasteurisation temperature. In the milk of the stable under discussion the time between milking and pasteurisation was too short for any readjustment.

PASTEURISATION WITHOUT COOLING

The first investigation dealt with the possibility of saving heat and time by pasteurising the warm milk without

cooling it first. However, the lapse of time between the milking of the first and the last of the sixty cows was more than 90 minutes and so many bacteria developed during this period that this method had to be abandoned. The second investigation dealt with the advisability of heating the milk to a temperature of 135° F. in the pasteuriser until all the cows had been milked, this temperature being considered high enough to check bacterial growth and low enough not to hurt the food value of the milk. But here also numerous bacteria developed. Every time milk was poured in the pasteuriser the temperature dropped at least 20° F. and numerous species found splendid conditions for growth. Thus even when the milk is pasteurised directly at the stable it is necessary to cool the milk first, which may be done in the pasteuriser itself by circulating cold water through the spiral tube while the milk of the different cows is poured in the reservoir.

The tests above mentioned were conducted in connection with temperature experiments and interfered with the latter experiments only so far as the milk to be pasteurised had a higher bacterial content than the stable conditions warranted.

TABLE III.—PASTEURISATION AT 142° F., HOLDING FOR 20 MINUTES

	Total Numbers	B. coli	Lactic acid Bacteria	Liquefiers
Last can emptied out	19,000	6	14,000	1,600
Raw milk just before heating	30,700	110	19,000	1,500
Heated to 142° F., in 12 min	18,400	28	4,400	500
Holding for 20 minutes	23,000	5	4,000	200
Cooled to 65° F. in 25 min	4,400	3	1,900	300
Stored in icewater for 24 hours	4,200	3	1,900	100

PASTEURISATION AT 140° F. HOLDING FOR 20 MINUTES

Raw milk before heating	21,000	1,300	20,000	?
Pasteurised milk	20,000	110	17,000	?

PASTEURISED AT 142° F. HOLDING 20 MINUTES

Cooled milk just before heating	5,700	55	3,100	1,100
Pasteurised milk	3,100	19	2,400	570

In the first two tests the milk was put in the pasteuriser as each can was full without being treated in any way. In the last one the milk was kept at a temperature of 46° F. The three analyses given in Table III show conclusively that holding the milk at a temperature of 140° (142° F.)

for 20 minutes is not sufficient to kill the coli bacteria present, and they also keep their virulence at much higher temperature. In the next test the temperature was raised to 145° F. and in order to increase the chances of success the milk was kept at 50° F. until ready to be pasteurised.

TABLE IV.—PASTEURISATION AT 145° F. HOLDING FOR 20 MINUTES

	Total numbers	B. coli	Lactic acid bacteria	Liquefiers
Last can.	25,500	60	12,800	400
Raw milk ½ hr. before heating	6,800	6	1,100	300
Milk just before heating	38,000	100	20,000	1,700
Heated to 145° F. in 12 minutes	4,300	7	2,300	700
Holding for 20 minutes	1,500	7	200	25
Cooled down to 65° F. in 25 minutes	1,700	15	1,000	150

Some of the results in Table IV were not expected. The mixed milk in the pasteuriser after two-thirds of the cows were milked contained only 7000 bacteria per c.c.; the last can poured out contained nearly 26,000 bacteria, and, after all the milk was in the pasteuriser, nearly 40,000 bacteria per c.c. were counted. The probable explanation is that the hard milkers and cows which were drying up were kept for the last, adding a small quantity of milk to the total bulk but large quantities of bacteria, as much on account of the dirt falling in the milk pails as the long time the warm milk was in the pail before it was poured in the pasteuriser. Similar conditions were found on many well managed farms and explained the poor return from many sanitary precautions taken by the owners.

So far all samples had been taken from the large tap which is found at the bottom of the pasteuriser vat. A quart of milk was collected in a sterile flask, immediately

cooled in ice, and then analysed. As the results were so irregular it was thought advisable to compare the samples taken directly from the vat and those taken from the tap. The temperature of the samples taken from the tap appeared to be also considerably lower than found in the bulk of the milk, suggesting an area in which bacteria might develop or escape the killing temperature maintained in the bulk of the milk. The mechanical problems of pasteurising apparatus do not come within the scope of this investigation, so a short note must suffice. When the temperature in the vat reached 145° F. the first quart of milk taken from the tap only registered 141½° F. and the second 142° F. After the milk had been held for 20 minutes at 145° F. the first quart of milk taken from the tap only registered 138° F. On account of these temperature differences, we must expect a higher bacterial count in the milk which is in the tap area than in the bulk of the milk.

TABLE V.—BACTERIAL CONTENT OF MILK IN THE MIDDLE OF THE VAT AND NEAR THE TAP

	Total Number	B. coli	Lactic acid bacteria	Liquefiers
Milk heated to 145° F. from tap	13,600	10	5,800	1,100
Milk heated to 145° F. from bulk	4,300	7	2,300	700
Milk held for 20 minutes, from tap	5,700	9	1,700	500
Milk held for 20 minutes, from bulk	1,500	7	200	25

In this test the influence of a few degrees of heat was noticeable in the total number of bacteria and in the liquefying bacteria. Thus milk heated to 145° F. and held at that temperature for 20 minutes contained

still several *B. coli*.

In the following tests the pasteurising temperature was raised a few degrees at a time until a satisfactory result was obtained. The results are given in Table VI.

TABLE VI.—MILK PASTEURISED AT VARIOUS TEMPERATURES AND HELD FOR 20 MINUTES

Temperature	Total number of bacteria	<i>B. coli</i>	Lactic acid bacteria	Liquefiers
147° F.	3,100	33	150	?
148° F.	5,200	100	4,500	?
150° F.	425	5	275	?
152° F.	500	20	450	?
154° F.	1,000	17	575	?
156° F.	3,900	3	3,750	?

The results in Table VI show that it is impossible to kill all *B. coli* even at a temperature of 156° F. and held for 20 minutes. However, above 152° F. the coli bacteria seemed to have lost their pathogenesis. The milk under discussion was used for infant feeding and about the time the milk was pasteurised at a temperature of 148° F. and 150° F., several cases of gastro enteritis and infantile enteritis occurred. Outbreaks of this kind happened at various periods but never since the temperature was raised above 152° F. and the most probable explanation is that the coli bac-

teria lost their virulence when pasteurised at 152° F.

During the summer and fall daily samples of pasteurised milk were analysed and although there was considerable variation in the results, a decided improvement was observed in the beginning of November. This improvement was the more noticeable as all samples of Montreal milk showed that same improvement in bacterial content. The following table gives the condensed results of the daily testing of the pasteurised milk:—

TABLE VII. DAILY ANALYSES OF PASTEURISED MILK

		Total Numbers	<i>B. coli</i>	Lactic acid bacteria.
August, 1916	Average	1,612	34	723
152°-151° F.	Highest <i>B. coli</i>	1,750	90	800 (152° F.)
	Lowest <i>B. coli</i>	950		100 (151° F.)
September	Average	1,376	26	948
150°-156° F.	Highest <i>B. coli</i>	875	53	550 (150° F.)
	Lowest <i>B. coli</i>	3,900	3	3,750 (156° F.)
October	Average	817	23	547
156° F.	Highest <i>B. coli</i>	1,400	15	975
	Lowest <i>B. coli</i>	700	1	400
November	Average	310	2	222
152°-148° F.	Highest <i>B. coli</i>	275	20	186 (152° F.)
	Lowest <i>B. coli</i>	90		70 (148° F.)
December	Average	500	2-3	440
146° F.	Highest <i>B. coli</i>	170	2	130
	Lowest <i>B. coli</i>	140		70

In the month of September two exceptional counts were recorded, namely:—

Sept. 28th— 7000 total, 1200 *B. coli*; 3000 lactic acid.
Sept. 29th— 14000 total; 1100 *B. coli*; 10000 lactic acid.

The milk had been pasteurised as usual at 156° F. but during these two days the cows had been feeding in a harvested corn-field, infecting the milk badly with very resistant *B. coli*.

The results obtained with this pasteuriser were very much the same as found in the case of other pasteurisation systems. Below in Table VIII will be found the

bacterial content of pasteurised milk heated by five different systems. The plants were specially selected as being conducted by large concerns which had spent much money to make their milk of a high standard. The poor results recorded here in spite of all this care are due to a poor quality of the raw milk and failure of pasteurisation at a temperature of 145° F.

TABLE VIII.

Name of Pasteuriser	Pasteurisation temperature.	Date	Total number bacteria	B. coli	Lactic acid bacteria	Liquefiers
<i>Simplex Continuous Long Distance Flow.</i>	144° F. holding 30 minutes.	June	37,500	200		
		July	73,000	445	42,000	7,000
		October..	54,000	3,500	47,000	1,000
		October.	42,000	350	40,000	..
		November.	7,000		6,800	..
<i>Creamery Package Pasteuriser</i>	142° F. holding 30 minutes.	June	10,000		5,000	5,000
		July.	354,000	3,500	210,000	12,000
		October.	35,000	300	31,000	175
		October.	50,000	400	40,000	..
		November	5,500		5,500	..
<i>Wisner Pasteuriser</i>	142° F. holding 30 minutes.	June.	5,000	...	5,000	
		July ..	12,000	40	6,000	400
		October.	5,100	220	4,000	1,000
		October.	11,000	150	9,000	200
		November	800		700	
<i>Gaulin's Pasteuriser</i>	145° F. holding 30 minutes.	June				
		July ..	270,000	200	220,000	300
		October.	15,000	350	13,000	?
		October.	3,000		1,000	
		November	8,000	12	7,000	
<i>Cherry Pasteuriser</i>	144° F. holding 30 minutes.	June	640,000	300	468,000	?
		July.	650,000	270	390,000	12,000
		October.	300,000	100	210,000	9,000
		October.	80,000	1,100	60,000	?
		November	8,100		8,000	?

The figures in Table VIII speak for themselves. During the summer some very high *B. coli* counts were recorded, and only when the sudden improvement in the quality of raw milk took place around the middle of November the pasteurised milk came up to the standard. It is very difficult to say what caused the general improvement in raw milk. In the stable which was all the time close under supervision the change was just as noticeable, and still it was impossible to observe any change in the general methods in this

stable. It will be interesting to note when the quality of the milk again becomes worse. Last spring it was about the second week of April, at a time when frost was quite general and there was considerable snow in the province of Quebec.

The five concerns represent the best milk in the Montreal district and in Table IX are collected some data regarding pasteurised milk of firms of poorer reputation. All milk was pasteurised below 145° F. and held for 25 to 30 minutes.

TABLE IX.

Dealer	Date	Total number of bacteria	B. coli	Lactic acid bacteria	Liquefiers
A	June	1,800,000	20,000	1,300,000	360,000
	July	2,300,000	49,000	2,200,000	?
	October	3,000,000	16,000	2,800,000	60,000
	October	6,000,000	24,000	5,900,000	?
	October.	1,800,000	4,500	1,700,000	2,000
	November	160,000	100	160,000	?
	December	180,000	1,950	160,000	20,000
	December	60,000	4,000	45,000	7,000
	June	87,000	1,800	67,000	10,000
	July	2,400,000	440	2,100,000	100,000
A.	October.	550,000	12,000	510,000	2,500
	October.	1,200,000	10,000	1,000,000	24,000
	November	60,000	700	60,000	
	November	315,000	5,000	305,000	7,000
	December.	44,000		30,000	12,000
	December.	120,000	1,000	110,000	10,000
	June	6,880,000	13,300	6,000,000	470,000
C	July.	9,900,000	4,000	9,800,000	100,000
	October.	80,000	300	72,000	1,600
	October.	102,000	5,700	90,000	10,000
	November	10,000		10,000	
	December.	25,000	25	24,000	50

The figures mentioned in Table IX are not very encouraging and still they do not represent the worst to be found in pasteurised milk.

A GENERAL REVIEW

All the milk mentioned in these foregoing tables was for a certain period of the

year—July to November—practically unfit for food, although pasteurised at the approved temperature of 140°-145° F. and held for 30 minutes. Investigations have shown that at a temperature of 158° F. only 5 per cent of the albumen is coagulated. There is no necessity for heating to such a high temperature, but at least

a temperature of 152° or 150° F. could be used without taking the least away from the digestibility of the milk. The only difficulty would be the disappearance of the cream line. Several dealers tried to raise their pasteurisation temperature, but as no cream line appeared on the milk the consumers became suspicious of the quality. The only solution is to educate the general public. To have milk in which the cream is so intimately mixed that it will not rise to the top is certainly an advantage for a beverage, not a drawback. The municipal authorities are very careful to prevent the milk dealers skimming off the fat from the milk, and so reduce the food value. On the other hand they are very anxious to enable housekeepers in general to do that same trick and remove the cream from the milk before it is served as a beverage. Milk is generally consumed by invalids and children, who need that extra percentage of fat very badly.

CONCLUSIONS

1. Raw milk produced under sanitary conditions and pasteurised at 145° F. for 20 minutes contained virulent coli bacteria causing enteritis in infants.

2. Pasteurised milk of reliable concerns contained during the summer so many coli bacteria that it was bound to have a harmful effect.

3. Milk pasteurised at 145° F. for 30 minutes by numerous small concerns contained so many coli bacteria (virulent gas producers) that the milk was unfit for consumption.

4. In milk pasteurised at 152° F. the coli bacteria had lost their virulence and most of them were killed.

5. In milk pasteurised at 152° F. in the proper way, the food value is unimpaired, and as the cream will not rise to the top it will be impossible to reduce its value as a beverage by skimming the cream off.

MEDIA USED IN THE EXPERIMENTS

The results obtained in the foregoing differ considerably from data published by other investigators. For this reason it may be of value to mention the media used more in detail.

Each milk sample was plated out in duplo on aesculin bilesalt agar, litmus lactose agar and litmus Conn's gelatine.

The different media were prepared as follows:

- (1) *Aesculin Bilesalt Agar.*
1000 water.
15 gr. agar.
10 gr. peptone Witte.
2½ gr. bilesalt.

Boiled together, neutralised and filtered. To the clear neutral liquid was added:
1½ gr. iron citrate (scales),
1 gr. aesculin.

The final acidity should be + 0.65 Normal.

- (2) *Litmus Lactose Agar.*
1000 water.
15 gr. agar,
10 gr. peptone Witte,
2½ gr. Liebig's beef extract.

Boiled together, brought to acidity of + 0.8 normal and filtered. To the clear liquid was added 20 gr. pure lactose.

Just before the media were poured in the plates 1 cc. of a ½ per cent blue litmus solution was added to each tube.

- (3) *Litmus Conn's gelatine.*
500 water,
500 whey,
15 gr. agar,
10 gr. Peptone Witte,
1½ gr. Liebig's beef extract.

Boiled together, brought to acidity of + 0.8 normal and filtered. Litmus added just before pouring the plates.

AESCULIN BILESALT AGAR FOR DETECTION OF THE COLON AEROGENES GROUP

The aesculin bilesalt agar plates were specially used for the identification of the colon-aerogenes group. On numerous occasions the count of this group on the aesculin bilesalt agar plates and on the litmus lactose agar plates would tally perfectly, but as a rule the aesculin bilesalt plates showed larger numbers of organisms producing black fields. The unexpected results obtained depend to a large extent on the reliability of the aesculin bilesalt agar media. During the years 1914 and 1915 a most exhaustive test of these culture media was conducted at Macdonald College, the results of which will be found in "*A Study of Some Organisms which produce Black Fields on Aesculin Bilesalt Media*," by Harrison and Vanderleck. Transactions of the Royal Society of Canada, Series III, Vol. IX, 1915.

As this publication is perhaps not within reach of many investigators a few of the results are cited here:—

(1) Out of the total number of 30,000 colonies producing black fields appearing on aesculin bilesalt agar plates made from milk, 600 were selected as being slightly atypical.

(2) Of these 600 colonies 10 were found not to belong to the colon aerogenes group.

(3) The 10 exceptions constituted only 1.5 per cent of the colonies actually tested, and 0.03 per cent of the total numbers of colonies present on the plates. This very high positive percentage does not allow any further doubt as to the reliability of the aesculin bilesalt agar plates for the identification of the colon aerogenes group.

BOARDS OF TRADE AND AGRICULTURE

BESIDES of late manifesting interest in the campaign for the increase of cultivation and production and endeavouring to some extent to meet the deficiency in labour, a number of Boards of Trade in Canada concern themselves with the advancement of agriculture in a general sense and at all times. Particularly is this the case in the West, although in the older provinces in several instances the Boards display a keen desire for the progress not only of their own special domain but also of the neighbouring rural district. A notable instance of this is furnished by the course pursued by the Belleville Board of Trade. Belleville being the centre of a large cheese district, the Board has taken active steps to see that the great dairy product has the best possible opportunity for gaining and maintaining a good hold on the British market.

"The first course taken", says a letter from Belleville, "was to induce a few of the leading farmers to become members of our local Board and, later on, have some of them attend the annual meetings of the Associated Boards of Trade held in Toronto and London. This worked out very successfully, and we succeeded in getting the farming community thoroughly aroused as to the value of the efforts we were making in their behalf. On three occasions an officer of the local Board visited Great Britain, made personal calls on numerous cheese importers, endeavouring to ascertain if any improvement could be made in the cheese produced in this district that would better suit the requirements of their customers. This appeared to appeal very favourably to the parties called upon, and finally resulted in cheese from this locality being sold in cities in Great Britain, where it had not before had a market."

On his return gatherings of farmers from the near-by counties were addressed by the officer, who detailed the lessons he had learned with considerable beneficial effect. In addition every effort was made to encourage immigration. The Board also in various ways endeavours to encourage farmers to improve and increase their herds.

WORK OF WESTERN BOARDS

In the West among the Boards especially active in this direction are those of Winnipeg, Saskatoon, Edmonton and Lethbridge. The Winnipeg Board not only co-

operates with the Grain Exchange in the bettering of marketing and transportation facilities, but, on its own behalf, subscribes towards the encouragement of boys in the acquirement of agricultural knowledge and experience. The Edmonton Board has devoted considerable energy to attracting a desirable class of agricultural settlers, and to promoting movements having for their object agricultural development and increased production. Marketing, transportation and mixed farming are other subjects to which the Board devotes attention. The Saskatoon Board takes an active interest in agricultural matters. Anything concerning the welfare of the farming community that comes to the Board's notice receives attention in a helpful way. Before the establishment of the agricultural college in Saskatchewan the advancement of agricultural education was one of the Board's activities. A leading officer writes; "I believe we were the first to bring in Siberian Alfalfas to this country. A good many years ago, we secured from Professor Hansen all the year-old roots of several varieties that he could give us, and handed them out among our farmers. The success of this alfalfa, particularly the Cossack, has been remarkable. We also distributed large numbers of strawberry plants of the Senator Dunlap variety. This was done some five years ago. The result is that a great many of our people are now growing very remarkable strawberries."

After describing an interesting experiment in rose-growing and other successful efforts in floriculture and saying "the proposition in this country is not what will grow, but what will not grow, if handled properly" the same officer says: "We have conducted several experiments from the U. S. Department of Agriculture, notably the testing out for three years, with the co-operation of Mr. Seager Wheeler, of Rosthern, of a red clover which would stand our winter. In this we were successful, the largest and finest red clover I ever saw being produced."

The Lethbridge Board testifies to its interest in, and goodwill towards, agriculture by devoting five of its eleven parts to the subject in its annual report for 1916. It deals with farming in all its branches, grain raising, vegetable growing, live stock and dairying, financing and marketing, the water supply, education and publications.

ASSOCIATIONS AND SOCIETIES

OTTAWA VACANT LOT ASSOCIATION

The Ottawa Vacant Lot Association, the organization of which was announced on page 328 of *THE AGRICULTURAL GAZETTE* for April, has been successful in bringing a large area of vacant land under cultivation. In addition to fifty areas more than an acre in extent, many small lots throughout the city have been put under crop by the al-

lotment system. The total area amounts to about 101 acres. All the allotments have been arranged on a basis of twenty-five feet by a hundred feet. Ten hundred and fifty plot-holders have been accommodated without fee of any kind. The members of the society numbers two hundred and ten.

BRANDON WINTER FAIR ASSOCIATION

The officers elected at the annual meeting of the Brandon, Man., Winter Fair and Live Stock Association were J. D.

McGregor, president; Joseph Donaldson, vice-president and John Inglis, secretary-treasurer.

THE ALBERTA CATTLE BREEDERS ASSOCIATION

The ninth auction sale of the Alberta Cattle Breeders' Association was held at Lacombe on May 30th. Eighty-nine purebred bulls changed hands for \$23,175, an average of \$260.89, nearly one hundred dollars more than the average of last year's sale, which was \$164 for 119 head. The Herefords obtained the highest average, 25 selling for \$7,390, an average of \$295.60. Bell Boy, 22908, for \$525, was the highest priced Hereford sold. The Shorthorns, however, captured the high-price record, Villager Perfection 103205, a two-year-old,

commanding \$825. The 51 Shorthorns sold brought \$12,835, an average of \$251.65. There were only 13 Aberdeen Angus at the sale. These realized \$2,950, an average of \$226.92.

Last year's breed averages were as follows:—85 Shorthorns, average \$158.69; 13 Herefords, average \$217.30; 16 Aberdeen Angus, average \$154.37.

The Alberta Cattle Breeders' Association, Calgary, has now sold 4,333 bulls for \$673,873, and this year's sales have reached the sum of \$159,996.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DAIRY AND COLD STORAGE BRANCH

The Use of Brine Tank Refrigerator Cars for Fruit Shipment, by Edwin Smith, B.S.A. Bulletin No. 50, Dairy and Cold Storage series. The subject dealt with in this 16-page bulletin with an elaborate series of illustrations and diagrams, received extended notice in the February number of *THE AGRICULTURAL GAZETTE*, Vol. IV, pages 110-114. Demonstrations made in 1915 and results of investigations mailed in 1916 are recorded. The new system of pre-cooling is also described at length.

THE ENTOMOLOGICAL BRANCH

Canadian Bark Beetles, Part I, description of new species, Bulletin No. 14 (Technical bulletin), by J. M. Swaine, Assistant

Entomologist in charge of Forest Insect Investigations. We have here a 32-page pamphlet constituting the first of a series that is to be published in response, as the Dominion Entomologist states, to a constant demand on the part of practical lumbermen, foresters and others for the practical and scientific information that it is proposed to give, the publication and distribution of which is expected to materially assist in the efforts that are being made for forest conservation.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NOVA SCOTIA

Annual Report of the Secretary for Agriculture for 1916. This volume of 515 pages embraces the reports of the Secretary for Agriculture, the Provincial Entomologist, Farm Superintendent, Superintendent of

Poultry, Superintendent of Dairying, Superintendent of Women's Institutes and of the agricultural societies. It also contains the report of the Principal of the agricultural college and the various departments thereof. A section of the report is devoted to a series of articles on soils.

NEW BRUNSWICK

Report of the Department of Agriculture for the year 1916. This report shows the work that was accomplished in the several divisions, including those of dairying, horticulture, poultry, immigration, agricultural societies, elementary agricultural education, bee-keeping, field culture, entomology and women's institutes.

QUEBEC

The Cultivation of Celery, by J. H. Lavoie, Chief of the Provincial Horticultural Service, assisted by Messrs. Hamel, Conton and Pitraz, Inspectors, and *How to Plan Your Fruit Trees*, also by J. H. Lavoie, respectively 12 and 8 pages, are recently issued bulletins Nos. 39 and 40 of the Horticultural Service.

The Great Fallacy of White Bread, by Doctor Aurele Nadeau, with a preface by Professor Arthur Rousseau, is the title of an eighty-page pamphlet, published on the authority of the Provincial Minister of Agriculture. It is a disquisition on the food value of different kinds of bread and extols the virtue of whole wheat bread as compared with purely white bread.

ONTARIO

Annual Report of the Live Stock Branch for 1916. This report of one hundred and fifty-two pages shows the activities of the Department as far as it relates to the live stock industry. The activities dealt with are the following: The Ontario Provincial Winter Fair for 1916; The Ottawa Winter Fair, 1917; financial statement and list of officers of the live stock associations; report of co-operative shipments of live stock and a list of the members of the Ontario live stock associations.

Scab Control, by Prof. L. Caesar, Provincial Entomologist, Guelph. This leaflet constitutes number one of volume three of the Fruit Branch circular, of the Ontario Department of Agriculture. The leaflet describes the disease of apple scab, explains how it works and gives specific instructions for its control by the use of fungicidal sprays.

MANITOBA

Circular No. 41, "Some Forage Crops for Manitoba", by T. J. Harrison, B.S.A., Professor of Field Husbandry. This circular of 8 pages is divided into Parts I and

II. Part I deals with the value and methods of culture of suitable forage for cattle, more especially dairy cows, while part II deals with soiling and pasture crops for hogs.

Marketing Manitoba's Wool Crop, 1917, explains fully the methods adopted by the provincial Department of Agriculture in grading and marketing and advises farmers relative to shearing, tying, packing and shipping. The circular, which is No. 33, revised to date, is plentifully illustrated.

Common Diseases and Disorders of the Foal, by C. D. McGilvray, M.D.V., Lecturer in Veterinary Science at Manitoba Agricultural College, is Extension Bulletin No. 13 and is a sequel to Extension Bulletin, No. 11, "Management of the Brood Mare and Foal". The more important diseases dealt with are constipation, scours, joint ill, escape of urine from the navel and hernia or rupture.

Proceedings of the Veterinary Association of Manitoba is a verbatim report in 50-page pamphlet form of the annual meeting at Brandon on March 8, 1917, of the Manitoba Veterinary Association. Dr. George Hilton, of the Health of Animals Branch, contributes a very instructive paper on "Diseases of Animals Transmissible to Man."

The Potato, Extension Bulletin No. 14; Manitoba Farmers' Library. This 28-page bulletin is divided into three parts, the first being "Potato Growing and Storing", by J. A. Neilson, B.S.A., Lecturer of the Horticultural Department, Manitoba Agricultural College, the second, "Potato Disease in Manitoba", by V. W. Jackson, B.A., Professor of Botany; the third, "Potatoes as Food", by Miss Ethel M. Eadie, Professor of Household Science.

BRITISH COLUMBIA

Chicken-Pox in Poultry, by H. E. Upton, Provincial Poultry Instructor. This pamphlet constitutes Circular Bulletin No. 20. It gives the symptoms, methods of prevention, and treatment which consists of vaccination. It shows photo engravings of birds suffering from the disease, indicating the characteristic appearance of affected fowls.

Announcements of Summer Schools for Teachers, issued by the Department of Education. This is a pamphlet of twenty-five pages announcing the summer school for teachers to be held in Victoria High School, July 3rd to August 3rd. This will be devoted to rural science, art, manual training, household economics, and vocal music and education. The pamphlet describes the regulations governing the course and the programme to be carried out.

MISCELLANEOUS

Agriculture in War Time, by Frank T. Shutt, M.A., D. Sc., Dominion Chemist, reprinted from the Transactions of the Royal Canadian Institute and published by the University of Toronto Press, 1917. This is a review in brief both of existing conditions and the lessons to be derived from the times. Education, Soil Cultivation, Farm Manures, Clover, Alfalfa and the Legumes Generally, Liming and Commercial Fertilizers are the headings of sec-

tions and indicate generally the contents of the pamphlet.

Summer Courses and Examinations in 1917, for Teachers. The courses announced in this publication, issued by the Ontario Department of Education, of 109 pages include those for agriculture and horticulture, household science, physical culture, manual training, and other subjects. In addition to a general announcement as to the dates and locations of the courses, the syllabus of each is given.

NOTES

Fifty-seven farmers owning about 1,000 sheep in the county of Lambton, will market their wool co-operatively through the central grading station at Guelph.

Mr. McKay, District Representative for Bruce County, Ontario, reports that about fifty Bruce County farmers will ship their wool to Guelph this year to be graded and sold co-operatively.

Mr. J. N. Allan, District Representative in Wentworth County, reports that a number of farmers in that county have taken advantage of the provisions for securing loans for the purchase of seed grain.

Mr. F. C. Patterson, District Representative for Muskoka and Parry Sound, reports that about seventy-five sheep breeders will send their wool, amounting to about 12,000 pounds, to the central grading station at Guelph this year.

Mr. G. R. Green, District Representative for Oxford County, reports having assisted the pupils of one of the public schools in planting shrubs and vines about the school building. The pupils prepared the ground in advance of the visit of the Representative.

Mr. H. Thornber, who has been Assistant Horticulturist in the Department of Agriculture, British Columbia, for five and a half years, has resigned to become Superintendent of the United States Department of Agriculture Experiment Station at Corvallis, Montana. Mr. Thornber is succeeded in British Columbia by Mr. E. White who has occupied the position of fruit inspector for the Victoria District for more than a year.

The Brandon Exhibition Association will hold a light tractor ploughing competition at their Summer Fair which will be held at Brandon on July 16 to 20th. A suitable piece of land for ploughing has been secured. The competition will be governed by rules as simple as possible in keeping with proper working arrangements.

The tractor outfit supplied by the Department of Agriculture for Ontario for Carleton County, is reported by W. D. Jackson, District Representative of that county, to have ploughed a tough sod at the rate of one acre in fifty minutes, at a cost of \$1.10. In the corn stubble of last year it ploughed at the rate of eight and a half to nine acres a day.

The farm tractor supplied by the Department of Agriculture, Ontario, for use in Peel County, is reported by J. W. Stark, District Representative, to have cultivated twenty-eight acres of land in 17½ hours on 29 gals. of coal oil. In this work an 8 foot spring tooth cultivator and a 9-foot harrow were used. The ground was left in fine condition for sowing. For ploughing sod it required three 10-hour days to do 18 acres. In this 33 gallons of coal oil and 1½ gallons of lubricating oil were used.

Short Courses in home economics by the Women's Institute Division of the Department of Agriculture of New Brunswick each winter are financed wholly from the funds provided under THE AGRICULTURAL INSTRUCTION ACT. For the courses held during February, March, and April of this year at Woodstock and Sussex, the railway fares of those attending, for amounts over \$2.00 were refunded. It has been decided that next winter the entire railway fares of delegates shall be met by the Department.

INDEX TO PERIODICAL LITERATURE

- Farm and Dairy and Rural Home*, Toronto, Ont., May 24, 1917.
The Feeding of the Dairy Cow—Some Principles and Explicit Directions, E. S. Archibald, B.A., B.S.A., Dominion Animal Husbandman, page 597.
- The Farmer's Advocate*, London, Ont., May 31, 1917.
How the Government and Stockmen Should Combat Tuberculosis, page 900.
June 14—Suggestions Anent the Control of Tuberculosis, H. Barton, Macdonald College, page 972.
Experiments with Vaccine and Serums in Contagious Abortion, F. Torrance, Veterinary Director General, page 972.
- The South African Fruit Grower*, Johannesburg, Cape Town, April, 1917.
Practical Suggestions for the Fruit Grower, R. A. Davis, Chief, Division of Horticulture, page 459.
- The Canadian Entomologist*, Toronto, Ont., June, 1917.
Popular and Practical Entomology. Two Apple Leaf Mites of Economic Importance, W. H. Brittain, Provincial Entomologist for Nova Scotia, page 185.
The Occurrence of *Eumerus strigatus* Fln. in Canada, Arthur Gibson, Entomological Branch, Department of Agriculture, Ottawa, page 190.
- Canadian Farm*, Toronto, May 25, 1917.
Training Horses for Work and Play by a Practical Horseman, page 4.
June 8—Producing Timothy Seed in Alberta, C. Sweet, Dominion Seed Branch, Calgary, page 5.
Controlling Contagious Abortion in Cattle, F. Torrance, Veterinary Director General, page 6.
- The Canadian Countryman*, Toronto, Ont., May 26, 1917.
Feeding Beef Cattle Grain on Pasture, page 681.
June 2—Increase the Production of Extracted Canadian Honey, F. W. L. Sladen, page 712.
Rennet in Cheese-making and its Substitutes, Professor H. H. Dean, page 713.
Declare War on the Bad Egg, M. A. Jull, page 713.
June 16—Rennet in Cheese-making and its Substitutes, Prof. H. H. Dean, page 776.
An Attractive Paper Container for Honey, F. W. L. Sladen, page 777.
- The Grain Growers' Guide*, Winnipeg, Man., May 23, 1917.
Cutworms and their Control, E. H. Strickland, Dominion Entomological Laboratory, Lethbridge, Alta., page 907.
- British Columbia Fruit and Farm Magazine*, June, 1917.
Soil Fertility—With Special Reference to Manure and Fertilizers—Rotation of Crops, Professor P. A. Bovington, University of B.C., page 3.
The State of Agriculture in British Columbia 1917, W. E. Scott, Deputy Minister of Agriculture, page 7.
Evolution of Agriculture, L. S. Klinck, Dean of Agriculture, University of British Columbia, page 9.
- The Maritime Farmer*, Sussex, N.B., May 8, 1917.
Varieties of Potatoes, W. W. Hubbard, Superintendent, Experimental Station, Fredericton, N.B., page 428.
May 29, 1917 Late Blight of Potatoes and Its Control, Geo. Patrick, Inspector of Plant Diseases, Fredericton, N.B., page 459.
Field Beans in Canada, W. L. Graham, B.S.A., Assistant Field Husbandman, page 461.
- The Farm and Ranch Review*, Calgary, Alta., May 21, 1917.
The Dairy Situation, C. P. Marker, Dairy Commissioner for the Province of Alberta, page 470.
Ploughs and Ploughing, Professor J. MacGregor Smith, University of Saskatchewan, Saskatoon, page 518.
- The Journal of Agriculture and Horticulture*, Quebec, June 1, 1917.
Some Essential Factors in Alfalfa Growing, page 237.
- The Farmer's Advocate*, Winnipeg, Man., June 6, 1917.
Water System for Farm Home, J. MacGregor Smith, page 848.
- The Saturday Press and Prairie Farm*, Saskatoon, Sask., June 9, 1917.
Common Garden Insects and Their Control, Arthur Gibson, Chief Assistant Entomologist, page 6.
- The Nor'-West Farmer*, Winnipeg, Man., June 5, 1917.
Review of the Dairy Situation in Alberta, C. Marker, Dairy Commissioner page 643.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, Institute Commissioner, Department of Agriculture, Ottawa.

Unless application through the Canadian Commissioner is preferred, the original Institute Bulletins may be obtained direct from the General Secretary of the International Institute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

	Per annum.
International Review of Agricultural Economics	18 francs
International Review of the Science and Practice of Agriculture	18 "
International Crop Report and Agricultural Statistics	6 "
The Three Bulletins together	36 "

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1162—Recent Investigations at the Imperial Institute of London concerning: Whales' Bones as a Phosphatic Manure; Naked Barley from Cyprus; Edible Beans from Burma; Colocynth Pulp from the Sudan; Paper-making Materials from South Africa; African Wild Silk.—*Bulletin of the Imperial Institute*, Vol. XIV, No. 2, London, April-June, 1916.

Whales' Bones from the Falkland Islands as a Phosphatic Manure. The whaling industry of the Falkland Islands and its dependencies (South Shetlands, Graham's Island, South Orkneys and South Georgia) is now the most important in the world. In the 1913-14 season 9,429 whales were

caught, the total value of the products being \$6,500,000. The bones, which accumulate in enormous quantities, were formerly thrown away, but are now boiled down with the flesh to extract the oil and the residue is converted into manure. In the 1913-14 season 1,327 bags of bone meal valued at \$2,500 were produced in South Georgia, while the entire colony and Dependencies in the same year produced 94,835 bags of whale guano valued at \$235,000.

An average sample of the bones reduced to a meal was analysed at the Imperial Institute with the following results, which are shown in comparison with those recorded for commercial raw bone meal:

	Present sample Per cent	Bone meal (English) untreated Per cent
Moisture	7 3	8 80
Organic matter (1)	40 4	34 94
Phosphoric acid (2) P ₂ O ₅	20 24	21 66
Lime, CaO	24 06	28 53
Magnesia, etc	7 39	4 62
Siliceous matter	0 61	1 45
(1) Containing nitrogen	3 87	4 19
(2) Equivalent in lime phosphate oil	44 20	47 33
Oil	11 5	about 10

The meal from whales' bones is therefore very similar in composition to English raw bone meal, as a source of oil and bone manure.

Naked Barley from Cyprus.—A sample of naked or skinless barley was received from Cyprus in October 1915. The grains varied in size, were of a light-brown colour and had a dull translucent appearance. Although a small percentage of the grains showed a brown discolouration in places, the sample was clean and in good condition. The fracture was translucent. No gluten was present in the grain. The germinating power was 96 per cent within five days. This barley is not suitable for malting or distilling, but will rank as a good feeding barley.

Colocynth Pulp from the Sudan.—Colocynth is the name given to the peeled,

dried fruits of *Citrullus Colocynthis*, Schrad., the material freed from seeds constituting the drug known as colocynth pulp, which is a drastic cathartic. Before the war it was obtained from Turkey and Austria, but recently considerable quantities have come from the Sudan.

Paper-Making Materials from South Africa.—The Bulletin discusses the possibility of utilizing various plants occurring in British possessions for paper-making. Tambookie Grass from the Transvaal gives a high yield of pulp of good quality which is easily bleached. Papyrus from Zululand can be converted into a satisfactory paper of good strength.

Varieties of edible beans from Burma and the occurrence of wild silk worms in Africa are also described in the Bulletin.

CROPS AND CULTIVATION

1168—Effect of the Variation in Quantities of Water Used, on the Decomposition of Crude Cyanamide and the Formation of Dicyandiamide.—HAGER G. and KERN J., in the *Journal of the Society of Chemical Industry*, Vol. XXXV, No. 15, pp. 856-857. London, August, 1916.

The authors conclude that calcium cyanamide should not be stored while damp, but should be used in that case immediately. The use of water to break it up into small particles is not advisable.

1170—Comparative Study of the Root Systems and Leaf Areas of corn and the Sorghums.—MILLER E. C., in the *Journal of Agricultural Research*, Vol. VI, No. 9, pp. 311-331. Washington May, 1916 (2 pages in Institute Bulletin).

The average leaf areas of five representative plants of corn, Blackhull kafir, and Dwarf milo were obtained at stages when the plants were 4, 6, 8 and 10 weeks of age. The last stage examined showed that the plants had completed their full-leaf development. In all the stages of growth the corn plant was found to have the greatest leaf area. Taking the stages of growth in order, one finds that the leaf area of the corn plant was 1.7, 2.0, 2.2, and 2.3 times the leaf area of Dwarf milo and 1.6, 1.9, 1.5, and 1.5 times that of Blackhull kafir.

The experiments show that the Dwarf milo and the Blackhull kafir plants would have the advantage over the corn plant under any climatic condition that would tend to bring about a loss of water from these plants. The two sorghums have, in the first place, as compared to the corn plant, only one-half the leaf surface exposed for the evaporation of water; and in the second place they have a root system which,

judging from the number of secondary roots, would be twice as efficient in the absorption of water from the soil.

1173—Agricultural Value of Impermeable Seeds.—HARRINGTON GEORGE T. in *Journal of Agricultural Research*, Vol. VI, No. 20, pp. 761-796, Washington, D.C., August, 1916 (4 pages in Institute Bulletin).

Impermeable seeds are those whose coats are impermeable to water at temperatures favourable for germination. They have been described as hard seeds. To determine the agricultural value of such seeds germination tests of alfalfa and clover seed were made during the years 1909 to 1916.

It is impossible to distinguish between impermeable and permeable seeds except by testing their ability to absorb water at a temperature favourable for germination. Impermeable seeds frequently retain their vitality for many years, sometimes for at least as many as 80 years. When fresh they germinate promptly when the seed coat is broken or becomes permeable, and their viability is frequently greater than that of fresh permeable seeds.

It is impossible to estimate even approximately in advance the proportion of the impermeable seeds in any given lot which will germinate in any given length of time under ordinary germination conditions. A widely variable proportion of the impermeable seeds of alfalfa, crimson clover, and the larger seeded commercial species included in this investigation produce seedlings promptly in the soil under greenhouse conditions or in the open field in warm weather. Only in exceptional cases is this true of the impermeable seeds of the clovers, other than crimson clover. The use of aqueous

extracts from soil has no effect, and alternate wetting and drying of the seeds has little effect on the germination of impermeable seeds. Within ordinary limits neither the depth of planting nor the firmness of the soil affects the germination of impermeable clover and alfalfa seeds under greenhouse conditions. These factors may affect the stand secured by preventing some of the seedlings from reaching the surface. Storing impermeable clover and alfalfa seeds at a temperature of 50° C. for one day or at 45° for six months has little or no effect upon their germinating capacity or permeability. Even under the most favourable conditions only a small proportion of impermeable red-clover, alsike-clover, white-clover, and white sweet-clover seeds produces seedlings promptly in the soil when sowed in warm weather. Impermeable seeds of red clover, alsike clover, white clover, and white sweet clover will pass the winter in the soil in a freezing climate without injury. At least 50 or 60 per cent of them may be expected to germinate in the soil the following spring unless a part of them germinate during warm weather in the winter. If this occurs, the seedlings produced in the winter are liable to be killed by subsequent freezing. A large proportion of impermeable alfalfa, crimson-clover, okra, and hairy-vetch seeds will germinate in the soil during the first few months after planting, some of them early enough to be of importance to the crop. Nearly all alfalfa and okra seeds, even if they are impermeable in the fall, are killed when they pass the winter in the soil or on the plants out of doors in a freezing climate. A small proportion of the impermeable alfalfa seeds survive with their vitality uninjured. Some of the okra seeds remain impermeable during the winter, but the majority even of those which remain impermeable are killed by the winter's exposure.

The author gives a series of rules as guides in agricultural practice with clover, alfalfa, hairy-vetch and okra.

1175—Results Obtained with a New Wheat "Carlotta Strampelli" in Italy (1).—STRAMPELLI, N., in *Minerva agraria* year XIII, No. 11-12, pp. 123-125, Rome. June 1916.

This variety of wheat has given very high yields, and has proven very resistant to lodging.

(1) See also Bulletin of Foreign Agricultural Intelligence, November 1916, page 825.

1180—The Production of Forage in Uruguay.—MOREIRA A.S. and MENDIZABAL, M. F., in *Republica Oriental del Uruguay, Ministerio de Industrias, Inspeccion Nacional de Ganaderia y Agricultura*, Bulletin No. 18, 22 pp. Montevideo, 1916.

The soil of Uruguay does not permit of permanent stands of lucerne, such as have been established in Argentina. Experiments have been made of inoculation with nitrugin obtained from the United States Department of Agriculture.

The article in the Institute Bulletin gives an account of the preparation of the soil, the time and method of sowing, quantity of seed used, methods of inoculation, the growth until the time of cutting, chemical analysis and nutritive value.

After investigations covering only the first cutting the authors conclude: (1) The Influence of the nitrugin is not shown during the period of germination and early development. (2) During the period preceding flowering the effect of the nitrugin is shown by more rapid development and greater vigour. The yield is greater when the lucerne has been inoculated. (4) Inoculated lucerne shows better resistance to *Pseudopeziza Medicaginis*.

LIVE STOCK AND BREEDING

1192—Experiments in the Feeding of Draught Horses in Sweden, 1908-15. —HANSSON, NILS (Director of the Division of Domestic Animals in the Central Agricultural Experiment Station of Stockholm), in *Fühlings landwirtschaftliche Zeitung*, Year LXXV, No. 13-14, pp. 289-315, Stuttgart, July 1916 (4 pages in Institute Bulletin).

The Central Swedish Agricultural Experiment Station conducted experiments from 1908 to 1915 to determine the value and practical utility of different rations for draught horses. The following results are given:

1. *Barley and Oats*.—The experiments show that 1 lb. of barley can replace 1 1/5 lb.

of oats. Barley did not act unfavourably from a dietetic point of view, and did not diminish the energy of the horses.

2. *Oats and Wheat bran*.—Wheat bran proved of considerable value, and increased to some extent the live weight of the animals.

3. *Oats and corn*.—Finely ground corn has a feeding value 20% higher than that of oats, 1 lb. of corn replacing 1 1/5 lb. of oats.

4. *Oat bran*.—Not more than 9 lb. per head per day should be given.

5. *Mixture of barley and oats, and a mixed feed "Gota"*.—Experiments with "Gota" (60% oat bran and 40% forage rice) and a barley and rye mixture show that

1½ lb. of the former equals 1 1-10 lb. of the latter. The two feeds proved excellent for horses.

6. *Barley and potato flakes*.—The results of the experiments were in favour of potato flakes, 1 lb. being equal in feeding value to the same quantity of barley.

7. *Barley and cooked potatoes*.—The two feeds were equally good.

8. *Mixture of oats and barley, and forage beets*.—Well cleaned beets or carrots may be fed to horses at the rate of up to 44 lb. per head per day, 1 lb. of dry root matter having the same nutritive value as 1 lb. of the oats and barley mixture.

1193—*Scales of Points Adopted for Holstein Friesian Bulls and Cows by the Holstein Friesian Association of the United States*.—BENNETT, E. G. in *Missouri State Board of Agriculture Monthly Bulletin*, Vol. XIII, No. 11, pp. 57-61 (Columbia, Missouri). November, 1915 (4 pages in Institute Bulletin).

1196—*Dairying on the River Murray Areas, South Australia*.—LANE, G., in the *Journal of Agriculture of South Australia*, Vol. XIX, No. 12, pp. 1043-1046. Adelaide, July 1916.

In the dry land areas dairying can be carried on with success only with the aid of ensilage. Without the silo the benefits of the green season are lost in trying to drag along with the stock during the dry part of the year. Ensilage is not only necessary for cattle but is equally good for sheep and lambs. The class of silo recommended is round, built of stone or lime concrete. The crops most employed are corn and sorghum, but oats, barley and wheat have given good results. Mangolds are produced when possible as butter produced from them is of the highest quality.

The author is not convinced that machine milking is better than hand milking. To ensure success, either in milk or butter selling, the animal heat should be got out of the fluid as soon as possible.

FARM ENGINEERING

1205—*The Farm Machine Industry and Co-operative Purchase of Farm Machinery in Russia in 1913* (1).—DECHEVOJ, M., in *The Machine in Agriculture*, Nos. 10 & 11, pp. 392-394 and 430-434. Kiev, 1916. KOVAL, V. D., *ibid*, No. 1, pp. 11-16 (3 pages in Institute Bulletin).

The total number of establishments for the manufacture of agricultural machines and instruments in Russia in 1913 was 921. In 1913 these establishments manufactured machines and instruments to the value of \$32,000,000. The industry has developed chiefly in Southern Russia. The total number of workmen employed in 1913 was from 40,000 to 45,000. The different kinds of machines produced in order of their total value ranked as follows: threshing-machines, ploughs, reapers, sowing machines, etc.

The co-operative trade in agricultural machinery is of considerable importance. There are not only societies for co-operative purchase, but also for co-operative production.

(1) See Bulletin of Foreign Agricultural Intelligence, March, 1916, No. 949).

1206—*Mechanical Ploughing in France*.—DE CABAUSSEL, P., in *La Vie Agricole et rurale*, Year VI, No. 41, pp. 269-274, Paris, October 1916. Lefort H. *ibid*, pp. 275-278 (3 pages in Institute Bulletin).

1208—*Dust Explosions and Fires in Grain Séparators in the Pacific Northwest*.—

PRICE D. J., in *United States Department of Agriculture Bulletin* No. 379, Washington, August 1916 (5 pages in Institute Bulletin).

In a detailed study the author examines 166 cases of explosives. The accidents were most frequent during August and most of them occurred between the hours of 2 and 7 in the afternoon. The point of origin of 76 % of the accidents was back of or near the cylinder. About 75 % of the occurrences were assigned to the presence of static electricity and to smut explosions. The explosions were generally distributed among all types of separators, and occurred in both steel and wooden ones, and in gasoline-driven as well as in steam-driven outfits. The operation of the machine at excessive speed is not essential to produce an explosion.

It was evident from the beginning of the investigation that a large quantity of static electricity was generated during the operation of the separator. In one case in Idaho a new machine was completely destroyed by an explosion. There was found to be 19 % smut in the crop and the weather was hot and dry. After investigation it was declared to be clearly a case of smut explosion by electrostatic ignition. In another case the owner of the machine stated that it was very heavily charged with static electricity on the morning of the explosion, to such an extent that it was not possible to touch any metal part without getting a shock.

Experimental work has shown that the dust produced during the handling of grain can be ignited under certain conditions, and will propagate a flame with explosive violence. It must not be concluded that grain dusts will ignite spontaneously. On the contrary there must be some outside source of heat. This source may be very small, as a heated coil or wire or an electric spark as used in the experimental work, or it may be larger, as a flame which may have a lower temperature but a larger heating surface. Many theories have been advanced as to the conditions under which dust explosions are produced and the amount of dust in suspension necessary to propagate the explosion. The predominating factors which determine the inflammability of a dust and the action of a dust explosion have not been definitely determined. It is generally agreed, however, that the dust must be fine and dry and in a state of suspension in the atmosphere, so that upon being brought into contact with sufficient heat or flame an ignition is caused. It generally is conceded that there must be a proper proportion in diffusion in order for the explosive mixture of dust and air to ignite with sufficient force to propagate an explosion.

The conditions under which these

thresher fires and explosions occur appear somewhat similar to those with other cereal dusts. During the threshing process the smut, which is a form of very fine, dry dust, is thrown into suspension in the air and forms a dangerously explosive mixture, which readily would produce an explosion or fire if ignited. The mixture of smut dust and air may have limits of explosibility, and it is quite possible at times to have too much dust present, and at other times not sufficient, for an ignition. For this reason explosions may occur at a given time and under certain conditions and not occur at other times or under different conditions.

Methods developed for preventing explosions or extinguishing fires.—The first method consists of a complete system of electrical connection from all of the moving parts to a common wire, and a thorough grounding of this common wire. The author describes how this should be done. Another method suggested is the installation of a suction fan to remove the dust from near the cylinder.

Since it was impossible to prove positively that either of the above mentioned devices is a sure preventive of fires, an automatic fire extinguisher was designed. A detailed illustrated description of this extinguisher is given in the original article.

AGRICULTURAL INDUSTRIES

1218 --The "Dairy Industry Act" of New South Wales, Explained.—O'CALLAGHAN, M.A., in *The Agricultural Gazette of New South Wales*, Vol. XXVII, part 6, pp. 409-414, Sydney, June 1916 (2 pages in Institute Bulletin).

Legally, the Act gives the Department the power to entirely control the work of butter factories almost from A to Z, and it also gives power to control, to a certain extent, the work in cheese factories, condensed milk factories, and margarine factories. Butter being the main section of the dairying industry in New South Wales, the Act has been built up around this industry mainly, and all the details of manufacture, including the testing of the cream, the grading of the cream, and the packing of the butter according to grade, may be controlled by an Inspector under this Act. In addition to this, the inspection of butter and the grading of butter for export to any place outside the State of New South Wales is controlled by this Act. The quality of the butter sold for consumption within New South Wales will also be checked, because the registered brands which will be used on butter boxes must indicate the quality; and there will be a constant check to see if the butter

contained in these branded boxes is true to description. Transit is also controlled, including the transit of cream to factories and the transit of butter from the butter factories and elsewhere. The storage of butter, both in factories and after it has left the factory, is also controlled. The system of payment by factories for cream is also controlled. In fact, there is nothing left out. The Act is very comprehensive, and, therefore, as already stated, a great responsibility rests on the Government.

The author quotes and comments on the clauses of the Act referring to the grading of cream, putrescent cream, control of butter-making, grading of butter for export, storage, etc.

1219 --International Market for Milk and Milk Products, January-March, 1917.—33rd Report. Compiled by the Swiss Agricultural Association. 4 pp. Brugg, Switzerland.

During the past quarter in all the European states agriculture suffered a great deal from the difficulties encountered by the import trade, especially as regards fodder. In consequence of the bad quality of crops the milk production has seriously decreased. At the same time bad harvests of grain

and corn resulted in the principle producing districts of North and South America. Last year complaints as to the difficulties of import were already justified; but in the meantime these have been increasing, and at present the situation may be said to be critical as to the procuring of food, the more so, as many trades in this line that have fairly subsisted up to now, will probably be hampered in future. A feeling of uncertainty with regard to the shadowy future is therefore prevailing throughout in an increasing degree.

Prices of Fodder.—During winter exceptionally large quantities of raw fodder have been used, a fact which is partly due to the inferior quality of hay, partly to the lack of fodder and the limited feeding of grain. The cold winter weather and the late beginning of vegetation have resulted in an increasing demand for hay. Large quantities have also been required by the armies. In vast districts fodder was very scarce. In Hungary prices stand on an unprecedented level. Italy and Great Britain, too experienced a marked advance in prices as compared with the previous year. Higher prices are also quoted in Austria, Switzerland and Holland, whereas the supply of raw fodder seems to have met with fewer difficulties in the northern countries of Europe, the prices being somewhat lower in Germany, Norway and Sweden.

The final result of last year's hay-crop in the United States was estimated to be 89,991,000 tons against 85,920,000 tons in 1916 and 66,234,000 tons on the average from 1910 to 1914. In spite of this hay made of clover and lucerne obtains higher prices than last year.

On the European continent the lack of fodder is getting worse than in the United States, the longer the war continues. This is the result of bad harvest all over the world, of war and the prohibitions imposed on commerce. It is quite impossible to get sufficient quantities of fodder, even if exceptional prices are offered, their prices having even more risen than those of raw fodder. The reports on bad harvests of corn in South America and the unfavourable conditions of winter-crops do not give promise of an improvement in the fodder market.

The Milk Supply.—The supply of milk during the first quarter shows a further considerable drop in all the European producing districts as compared with the corresponding period of last year, but especially in Austria, Hungary, Italy, France and Switzerland. The production was more satisfactory in Germany, Norway, Sweden, Holland, Denmark, England and Scotland, although in these countries, too, the supply has been limited seriously in many instances.

This relapse has been due to the total

lack of fodder, to an unusual scarcity of hay and its bad quality. In the warring states the decreasing number of labourers also exerts an unfavourable influence on the production of milk. In consequence of the fixing of maximum prices the supply of milk was still more limited and cattle were reared in increasing numbers.

Fluctuations in the price of milk.—The situation on the milk market presents a similar picture to that of the fourth quarter of 1916. The greatly decreased production and the active demand for milk and all sorts of dairy produce led to a considerable advance in milk prices in all European countries. In so far as prices were not regulated by government and other authorities the rising tendency made further progress during the past quarter. The favourable state of the market for all milk products resulted in advanced prices in the United States of North America, too, as well as in Canada.

Fluctuations in the Price of Cheese.—Owing to the very scanty supply of milk the prices showed a further tendency to rise on all European cheese markets during the past quarter. Only in those places where maximum prices have been fixed by authority, prices stand at the same figure as in the preceding periods. In all districts the production was very small; market supplies, therefore, could not increase towards spring, as had been expected. Stocks are, therefore, diminishing rapidly. In the United States and in Canada the brisk demand for export trade caused a further advance in price; on the market the tendency was very firm during the whole quarter.

Fluctuations in the butter price.—Both on the European continents and in Great Britain, as well as in America butter obtained the highest price quoted hitherto. The supply of milk being very scanty in all countries, in addition to the lack of milk the scarcity of butter made itself felt in a higher degree, the more so, as other fats could not be bought in sufficient quantities. In many instances the making of butter was limited, in order to secure the supply of milk for consumption. Energetic measures had to be taken for the supply of butter and fats even in countries which are used to sending butter abroad. In Germany and Holland only, a further advance in price could be avoided owing to the fixing of maximum prices by government. In comparison with the month of March 1916 higher prices are obtained in all countries. The advance amounts in Austria to 34.4%, in Hungary 74.7%, in Italy 13.3%, in France 17%, in Germany 8.4%, in Switzerland 20.2%, in Norway 31.8%, in Sweden 11.6%, in Denmark 27.8%, in Holland 16.3%, in the United States 17.4% and in Canada 28.6%.

Tendency of Prices during the Coming Months.—Austria.—The present high prices of butter and cheese will no doubt exert an influence on the prices of summer milk. Most correspondents agree that during the coming months the prices of milk, cheese and butter will rise.

Hungary.—Notwithstanding the fact that the prices of milk and its products are already unusually high, a further advance seems to be inevitable on account of the decreasing production. As regards milk and cheese maximum prices are in prospect.

Italy.—All our correspondents are of the opinion that rising prices for milk, butter and cheese are to be looked for in spite of the government's reluctance to fix higher prices.

France.—The tendency for milk and its products is quite firm. In the case of butter alone a slight weakening in price may be expected with the advent of warmer weather. It can not yet be said what will be the effect of the maximum prices for cheese which came into force at the beginning of April.

German Empire.—With the commencement of green feed the milk supply will probably increase and with this the difficulties of providing milk and dairy produce will be rendered somewhat lighter. Most correspondents, therefore, do not foresee any considerable changes in the state of the market for the next quarter, the more so, as the milk trade and the fixation of prices are regulated by the government for the whole empire.

Switzerland.—The production of milk has greatly fallen off. In order to raise the supply somewhat, energetic measures had to be taken, and higher prices were granted for the next six months.

Norway.—A slight advance in price for milk and dairy produce is in prospect according to the correspondents. In Sweden, too, the tendency will be slightly rising.

Holland.—In Holland a slight rise in milk prices is foreshadowed, but the prices of cheese and butter will not alter to any great extent.

England and Scotland.—The increasing difficulties to supply the country with provisions will probably lead to rising prices for milk for consumption. The butter and cheese trade will hardly be able to cover the active demand.

United States of America.—Although in the United States the milk supply is generally satisfactory, milk will stand in great demand for making cheese and condensing. All sales of summer milk which have been effected up to now have resulted in a considerable rise in price as regards wholesale dealers of milk for consumption and condensing firms. The state of the butter and cheese market is also quite

firm, and a weakening in price is not likely during the coming months.

1224—*Study of the Preparation of Frozen and Dried Eggs.*—PENNINGTON, M. E., etc., in *United States Department of Agriculture Bulletin No. 224*, 99 pp. Washington, April 1916 (5 pages in Institute Bulletin).

The authors comment on the work of the best types of egg-breaking plants in the Middle Western States. They then describe in detail the investigations and the working of the plants. They sum up as follows: 1. Eggs commonly used for breaking stock by reputable firms are small and over-sized eggs, dirty and cracked eggs, and shrunken eggs. 2. In order to check deterioration, the eggs should be held in chilled surroundings before and during the process of candling, breaking, and mixing preparatory to freezing or drying. 3. All eggs, even during the spring months, should be candled previous to breaking. 4. In order to insure well-candled eggs going to the breaking room, the system of candling should be such that the work of the individual candlers is checked. 5. In order to prevent waste, the eggs difficult to grade should be set aside by the regular candlers to be recandled by an expert. 6. All eggs used in the preparation of frozen and dried eggs should be graded out of the shell as well as by the candle, because certain heavily infected eggs, such as sour eggs and eggs with green whites, can only be detected when broken. 7. In order to insure a good product, bacterial cleanliness and careful grading must be obtained during the process of preparation. 8. The fingers of the breakers should be kept dry and clean. 9. In order to prevent waste and to insure good grading, not more than three eggs should be broken into a cup before emptying. 10. Good eggs should not be saved when a bad egg has been broken into a cup with them. 11. White and yoke are contaminated less by the mechanical than the shell method of separation. Only clean eggs should be separated by the latter process. 12. The percentage of "rots" rejected on candling and the organisms in the liquid egg saved increases as the season advances. 13. Canned eggs with the majority of samples having counts of less than 5,000,000 bacteria per gram, and with 100,000 *B. coli* or less can be prepared in the producing section from regular breaking stock, provided strict cleanliness and careful grading have been observed. The ammoniacal nitrogen will very seldom be over 0.0024 on the wet basis or 0.0087 on the dry basis. 14. A second-grade frozen product produced from eggs showing incipient decomposition to the senses, such as "beginning sours" and eggs with green

whites, are not only heavily infected but chemically decomposed. These eggs are unfit for food purposes. 15. Only two grades of canned eggs should be prepared when grading eggs out of the shell, namely, food eggs and tanners' egg. 16. Leaking eggs handled on special trays between candling and breaking room and graded carefully are as fit for breaking as regular breaking stock. 17. Tanners' egg contains markedly larger numbers of bacteria and larger amounts of amoniacal nitrogen than does food egg. 18. The control of the supply of air to drying belts to prevent saturation from the liquid egg is an

important factor in preventing multiplication of bacteria in the product during the process of desiccation. 19. The amount of ammoniacal nitrogen in desiccated egg is not a reliable index to the quality of the raw material from which it is prepared, because this substance is volatilized unevenly during the process of desiccation. 20. The following eggs should be discarded during grading: Black, white, mixed and sour rots, eggs with green whites, eggs with stuck yolks, musty eggs moldy eggs, "blood rings," eggs containing diffuse blood, and eggs with abnormal odour.

PLANT DISEASES

1226—Climatic Conditions as Related to *Cercospora Beticola*.—POOL, V. W., and MCKAY, W. B., in the *Journal of Agricultural Research*, Vol. VI, No. 1, pp. 21-60, Washington, 1916.

1230—The Reappearance of *Phytophthora Infestans* in the Potato Plant.—ERIKSSON, JAKOB, in *Comptes rendus hebdomadaires des Séances de l'Académie des Sciences*, Vol. 163, No. 4, pp. 97-100. Paris 1916 (2 pages in Institute Bulletin).

1232—*Fusarium Oxysporum* and *F. Trichothecioides* as Causes of Rot in Potatoes and Withering of the Potato Plant.—LINK, G. K. K., in *The Botanical Gazette*, Vol. LXII, No. 1, pp. 169-209, Chicago, September, 1916.

1235—*Botrytis* (Cinerea) and *Rhizopus* (Nigricans?) as Causes of Rot in Strawberries in the United States,. —STEVENS. NEIL E., in *Journal of Agricultural Research*, Vol. VI, No. 10, pp. 361-366, Washington, 1916.

INJURIOUS INSECTS

1244—*Chrysopa Californica* (Green Lacewing Fly) a Natural Enemy of Injurious Insects in the United States.—WILDERMUTH, V. L., in the *Journal of Agricultural Research*, Vol. VI, No. 14, pp. 515-525, Washington, 1916.

The larvae of the lacewing fly attack the following species of insects: Clover mite (*Bryobia pratensis* Garman), Two-spotted mite (*Tetranychus mytilaspidis* Riley), Red spider (*T. telarius* Linnaeus), Apple leafhopper (*Empoas a mali* Le Baron), Grape leafhopper (*Typhlocyba comes* Say), the pear Psylla (*Psylla pyricola* Foerster), Mealy plum plan. louse (*Hyalopterus arundinis* Fabricius), Melon aphid (*Aphis gossypii* Glover), Black peach aphid (*Aphis persicae-niger* Erwin Smith), Green Citrus plant louse (*Macrosiphum citrifolii* Ashmead), Citrus mealy bug (*Pseudococcus citri* Risso), Frosted scale (*Eulecanium prunosum* Coquillett), Red scale (*Chrysomphalus aurantii* Maskell), Purple scale (*Lepidosaphes beckii* Newman), wheat thrips (*Euthrips tritici* Fitch), barley mite

(*Notophallus viridis* Banks) and on the "green bug" (*Toxoptera graminum* Rondani), corn leaf aphid (*Aphis maidis* Fitch).

Each female lays an average of 30 eggs placed on a long stalk or pedicel. The duration of the egg stage is from 6 to 12 days. The larvae in the course of their development moult twice, which divides the larval period into three instars, with a total length of from 12 to 22 days. The larvae are extremely voracious, each eating from 74 to 160 full-grown aphids. The pupal stage varies from 14 to 23 days with an average of 16½ days for March and 20 7-11 days for November. There are at least 6 generations of the *Chrysopa* annually. The first covers the period from about February 15th to March 15th, and the remaining generations follow one another every 40 to 45 days until late in October. The insect is common in the Pacific Coast States, Texas, Arizona, New Mexico, Nevada, Lower California and Utah. Among its national enemies are the Western wood pewee and the night-hawk.

AGRICULTURAL ECONOMICS

CO-OPERATIVE DAIRIES IN NEW ZEALAND

Among the various types of agricultural co-operative societies which occur in New Zealand the first place belongs to the co-operative dairies.

It is only about 33 years since co-operative dairies under the factory system were started in New Zealand. At that time the outlook for the small farmers was very disheartening. The output exceeded the local demand. The nearest outside market, Australia, was 1200 miles away. The main market in England was 16,000 miles distant. Stock was selling at ruinous prices, and butter at 6c. to 8c. per lb. So the dairymen, like the pastoralists, were compelled to cooperate to improve the quality of their produce and to reduce the cost of manufacture; and after the introduction of refrigeration in 1882 they began to combine in order to secure the most skillful managers and the very best and most up-to-date machinery and plant. The establishment of butter factories brought a market to the farmers, who, for want of roads, could not get bulky produce to the market.

There are now 492 butter and cheese factories at work. These turned out last season 11,425 tons of butter and 59,699 tons of cheese. Of these factories not less than 357 are owned by the suppliers, and the number worked on co-operative lines is steadily increasing. Of late years the failure of a co-operative factory has been practically unknown. Most of them divide the profits among the suppliers who are also responsible if any losses are made. The amount paid for the milk from month to month is somewhat below its true value, but (after paying a small interest on capital) the surplus is divided among the suppliers at the end of the season. The government secured experienced men to advise the settlers how to start the factories; and where there are a sufficient number of settlers in the district, who own a sufficient number of cows and are willing to take shares in the concern, success is assured. A government officer usually attends a meeting of the settlers for the purpose of explaining how the business may be organized, and how the members of the company (by guaranteeing an overdraft at the bank) can raise the capital required to erect the building and instal the necessary plant. He also furnishes them with a plan of the building, and particulars of the best machinery and assists them to select the most suitable site.

The government also appointed a number of dairy instructors who, by visiting the factories and farms, by practical demon-

strations, and by expert advice have done much to extend co-operative dairies and to improve the quality and uniformity of the butter and cheese, the means of transit and the disposal and distribution in the English markets.

In some districts the principle of co-operation has extended to the establishment of refrigerating works by the dairy companies, each company taking up so many shares in the venture. In this way the cost of freezing butter and of storing and chilling cheese has been reduced to a minimum.

A further instance of united action on the part of dairy farmers is afforded by the Egmont Box-making Company at Eltham. The membership in this concern (which operates a saw-mill and tramway lines, and owns large tracts of timber country), is confined to the dairy companies, who are supplied with all butter boxes and cheese crates required for their produce at a more reasonable price than would otherwise be the case. About 130 timber workers are employed and something like 2,000,000 feet of timber are felled and then milled and converted into butter boxes and cheese crates each year. The board of management is selected by the dairy companies interested in the concern.

The government has also fostered the formation of co-operative herd testing associations. This was commenced in New Zealand on the co-operative principle in 1909, by one association that tested 815 cows. The following year three additional associations were started. Two years later the number of herd testing societies had risen to twenty, and they dealt with about 25,000 cows. In 1913, the number of cows tested increased to 30,000. Besides these semi-official associations many of the dairy companies are making herd testing a branch of the ordinary factory work, so that all their suppliers may benefit by the weeding out of unprofitable cows from their herds.

As a typical example of the rise and progress of a farmers' company, and the manner in which the farmers' produce has been enhanced in price by co-operative production, the *International Review of Agricultural Economics* instances the New Zealand Dairy Association in the Auckland district.

Last year this company manufactured 10,737,775 lbs. of butter, and 65 tons of casein, and the turnover was \$3,174,850. Practically all the shares (with the exception of a few belonging to the employees) are held by the suppliers, who number

about 2500; no supplier is compelled to take shares, but the annual bonus is divided among the shareholders only. The company has now eight butter and cheese factories, about 80 skimming stations, and a casein factory. It owns property valued at about \$487,000. The price paid last year for butter fat to shareholder suppliers at the larger creameries (including a dividend of 6 per cent. on the paid up capital), was about 28 cents per lb. or about double that paid in 1895; the suppliers of the small creameries receiving a trifle less, according to their quantity bonus. It is stated that there are only two dairy associations of this kind in the world, that have a larger output, viz., The Beatrice Company at Lincoln (Nebraska, U.S.A.) and the Byron Bay Company in New South Wales. This Company has for some years regularly tested the cows of its suppliers. In 1913 it tested about 3,800 cows. The average return per cow was 208.85 lbs. of butter fat. In the following year the average yield per cow was 283.6 lbs., an increase of 74.75 lbs. The best herd tested averaged 384.34 per cow and the worst herd

207.34 lbs. for the ten months. The worst cow tested that year gave a ten months' yield of 109.10 lbs.; while the best cow yielded 502.54 lbs. or a monetary return of more than \$100 over that of the poorest one.

The company also purchased for its suppliers last year \$96,426 worth of dairy requisites such as milk cans, separators and cement, molasses, manures and veterinary drugs. These are sold to the farmers at slightly over cost price, thus saving the producers a considerable sum during the year.

This company also (like others) assists its suppliers by advancing money to buy cows and milking plant, and manures to improve their farms, a portion of the monthly cheque for their milk being held back to repay the debt. This enables small landowners to tide over bad harvests and times of financial strain, and so to start farming without much capital.

(Summarized from the *International Review of Agricultural Economics*, November 1916, pp. 18-34).

PROFITABLE TRADING FOR COUNTRY GIRLS IN THE UNITED STATES

The girls' clubs for preserving fruit and vegetables in North Carolina are striking examples of clubs adapted to commercial needs. The gradual improvement of their organization might serve as an example. In 1902 the clubs produced only 70,000 boxes; in 1915 this figure had risen to 633,000.

The canning clubs first sought to sell their preserves wholesale, and to this end sent sample cases of tomatoes to large grocery establishments in New York. The dealers appreciated the quality of the goods, but did not close with the offer of the clubs because the products were not sufficiently uniform. In the following year the clubs profited by this lesson. For the first year the stock of preserves was sold locally in the villages, as well as might be, under the direction of the superintendent, but at the same time the rules for jam-making and preserving vegetables were rendered yet more strict. It was laid down that every box which did not give satisfaction to the purchaser would be changed by the member responsible for it or the price paid for it returned, and that every member convicted of flagrantly breaking the rules would be deprived of her right to use the club's ticket.

After a very short lapse of time the girls of all ages understood the commercial side of their work. The desired uniformity

was attained rapidly and personal initiative did the rest.

The following is the simplest method of sale and that which was first adopted. As soon as the preserves were made the members placed a certain quantity of them on barrows and, having already advertised their intention in the local newspapers, hawked their wares themselves in the towns and villages of a certain district. If they ran short of stock orders were taken by the county agricultural agent, who handed them on to the different clubs to be executed, and who was periodically informed of the progress of business. Sometimes recourse was had to a yet more primitive device; on the highroad placards at the entrances to farms gave a list of the preserves which were for sale, in order to tempt passers-by. Sometimes again an attempt was made to secure the custom of a neighbouring factory. But in a market thus secured there was always an accidental element, and as the organization developed and production increased it was sought to sell the preserves on a more solid and a purely commercial basis.

The first step to take was obvious—to sell to dealers of the district in which the club was situated. The women of the neighbourhood who had tasted the canning club's preserves could and did recommend

them to the grocer. In several counties the disposal of products has been thus arranged. The county agent or instructress visits the local grocers once a week or once a fortnight, collects orders and arranges for their execution. The result has been a localization of provisioning. Knowing they can sell their preserves to the local shops the farmers have, in return, ceased to order their groceries from enormous establishments in the Northern States, and get their supplies from neighbouring grocers. This is why the notices which adorn shop windows, above jars of various jams and of French beans and tomatoes, can truthfully announce that mutual agreement expressed by the phrase: "We buy in the country and the country buys from us."

Such procedure is not however universal. In certain districts the agricultural agents prefer the method of organizing in the town a special sale day, called *Buy-a-can-day*. This day is much advertised beforehand in the local press and by means of large sheets of linen, inscribed with enormous letters and stretched across the streets. On the appointed date the county instructress helped by two instructresses of neighbouring counties and several canning club girls, all wearing white caps and aprons, demonstrates to the public methods of utilizing the preserves, and the housewives are invited to taste them. Orders then flow in. By means of this publicity the clubs, by the medium of the county agents, have secured the custom of colleges and other institutions and of large hotels. Thus the desired large market has been found. The fact is due as much to the excellent quality of the preserves—tomatoes, French beans, pickles, jams and jellies—as to the skill and perseverance exercised in bringing them before the public.

This second stage in the development of methods of sale, successful as it is, would not meet all the demands of an incessantly increasing production and a growing market. It is therefore planned to organise canning club members into selling associations. These will be of three grades: the single club, the union of all the clubs of a county, and finally that of all the clubs of a state. It is a principle that sales should not be effected outside of the territory of the vendor's state.

In local clubs the selling association would be formed by all the members, from among whom the club superintendent or

the county agent would choose an executive committee of five, to include the president. These girls would be chosen for commercial skill and aptitude and would be responsible for securing the sale of all the products of the club. The committee would have to compile a list of all the preserves made, see that they conformed to the appointed standard and dispose of them. Thus uniformity in method of sale would be secured. The local clubs would realize that it is unprofitable to sell at the same time to dealers and to the public directly, and they would choose one or other type of custom. The committees would meet frequently and would, when necessary, organize selling campaigns.

It is permissible to hope that this organization will enable the clubs to sell their total products locally. If however their production exceed the local demand the executive committee can call upon the county organization. The latter will include the presidents of all the local county committees, and will meet at least once a month during the selling season. From it the county agent will choose the executive committee of the county selling association, which will be responsible for selling the excess products of local clubs, seeking markets within the county, and maintaining the equilibrium of demand and supply.

If this second committee also finds that, in spite of all its efforts, it is left with a stock of unsold products, it can appeal to the central selling association of the State, which will be constituted by the presidents of county associations, from whose number the chief instructor in domestic economy will choose a third committee, charged to sell all the excess products of the clubs. Because local sales are most profitable, since they entail no expenditure on packing or carriage, the clubs should appeal to a county association, and the latter should call upon the central association only in case of necessity. To cover expenses a commission of 2½ per cent on every dozen boxes is deducted from the price of all preserves sold by the central organization.

The selling associations are already at work, and their promoters claim that they will regularize the sale of preserves made by the canning clubs, who through them will obtain good profits proportionate to the fruit and vegetables used.—(Summarized from the *International Review of Agricultural Economics*, November 1916, pp. 1-12).

AGRICULTURAL STATISTICS

FOREIGN CROP CONDITIONS

THE May number of the Institute Bulletin of Agricultural Statistics gives details concerning the state of growing crops on the first of May. In Europe generally the weather up to April 20th was rainy and cold, thereby causing delay in spring work and being unfavourable for growth. The last ten days of April were, however, very favourable both for field work and spring sowing. At the beginning of May the condition of the crops was average in Spain and the Netherlands but only mediocre in France, Great Britain, Italy and Switzerland. In Algeria, in spite of the persistent drought in the south-east, the condition of crops was an average one, while in Tunis the weather had been favourable for agriculture and crops were in a fine condition in many places.

In the southern hemisphere the harvest in Uruguay was very poor, the wheat production being only 54% of the crop of the previous year, oats 84%, and flaxseed 31%. Adding the data from Uruguay to those already available from the countries in the southern hemisphere, there results a total yield of wheat in Argentina, Uruguay, Australia and New Zealand amounting to 232,705,000 bushels against 369,256,000 in 1915-16 and 251,106,000 the average from 1909-10 to 1913-14. Compared with the two last mentioned yields that of 1916-17 is only 63 and 93%, respectively. Of oats these four countries produced in 1916-17 a total of 59,855,000 bushels against 100,823,000 in 1915-16 and 85,008,000 on the average or 59 and 70% of the two last mentioned yields. Finally, of flaxseed Argentina and Uruguay together produced in 1916-17 4,188,000 bushels against 39,655,000 last year and 32,518,000 the average yield.

The United States June crop report estimates the area sown to spring wheat at 19,039,000 acres against 17,956,000 acres harvested last year. A crop of 283,000,000 bushels is indicated by the condition percentage, compared with 158,142,000 in 1916. Winter wheat, however, promises only 373,000,000 bushels against 481,744,000 last year. The estimated crop of winter and spring wheat together is therefore 656,000,000 bushels compared with 639,886,000 in 1916 and 1,025,801,000 in 1915. This year's crop of oats is estimated at 1,381,000,000 bushels against 1,251,992,-

000 last year and 1,549,030,000 in 1915 the latter being the record crop.

Broomhall's latest crop cable, issued June 12, is as follows:

France: Weather is showery and this is improving both winter and spring crops. The general agricultural situation is quite satisfactory. Acreage is reduced and the general yield will be very short. Import needs large.

Russia: Weather is mild and clear. Crop prospects fair. Acreage reduced and yield will be under normal. Small arrivals at trading centres, owing to impassable roads and scarcity of supplies. Exports during the season will be moderate.

United Kingdom: Weather and crop accounts continue favourable. Growing weather has revealed good growth, where previously thought lost. Stocks are increasing and floating quantity large.

Italy: Weather is warm and clear. Dryness is reported over a wide area and crop prospects fair. Weeds and vermin are in evidence, owing to lack of proper cultivation. Stocks moderate and foreign arrivals fair. Import requirements large.

Scandinavian Countries: Crop prospects fair. Winter damage was important and spring weather unfavourable. Stocks light.

Balkan States: Weather fine, being warm and moist. Crop prospects fair on a greatly reduced acreage. Corn outlook poor. Oats unfavourable.

Canada: Reports from official sources confirm an excellent crop outlook with weather favouring. Acreage large. Reserves liberal.

India: Weather favourable for the movement and port arrivals of wheat are liberal. Native food grain is in good supply. Clearness increasing.

Australia: Crop outlook uncertain. Dryness continues over a wide area and elsewhere too much rain. It is fairly certain that the yield will be under last year.

Argentina: Very favourable reports continue to come to hand regarding weather and crop prospects. Acreage will be large.

North Africa: Harvest prospects good except that locusts threaten damage.

LIVE STOCK STATISTICS

The following official live stock statistics were published in the April number of the Institute Bulletin:

FRANCE

CLASSIFICATION	31 December, 1916	1 July, 1916	Nov.-Dec., 1915
Horses	2,245,630	2,281,415	2,209,191
Mules	147,630	150,069	145,337
Asses	326,570	329,469	322,573
Cattle	12,341,950	12,723,946	12,520,106
Sheep	10,845,280	12,079,211	12,261,782
Pigs	4,361,900	4,448,366	4,909,886
Goats	1,176,510	(1)	1,231,879

NOTE - These statistics do not include the number of livestock in the districts occupied by the enemy. (1) Data incomplete.

CUBA

CLASSIFICATION	2nd Half-year, 1916	2nd Half-year, 1915
Cattle	3,961,731	3,703,928
Horses	750,219	720,040
Mules	58,039	54,264
Asses	3,005	2,882

NEW ZEALAND

CLASSIFICATION	Number on 1 January, 1916 (1)	Number on 1 April, 1911
Horses	347,345	404,284
Asses and mules	230	404
Cattle	2,387,036	2,020,171
Sheep	24,788,150 (a)	23,996,126 (b)
Swine	292,115	348,754
Goats	17,165	

(1) According to "Monthly Extract of Statistics" town areas excluded.

(a) 30 April, 1916.

(b) 30 April, 1911.

COURSE OF OCEAN FREIGHTS ON WHEAT

DATE	New York to Liverpool	Karachi to Liverpool	Buenos Aires to Liverpool	Australia to United Kingdom (Sailer)	Australia to United Kingdom (Steamer)
	c. per bus.	c. per bus.	c. per bus.	c. per bus.	c. per bus.
Average of five years ending					
1913	4 8	10 9	8 4	17 0	
1916					
March 14	51 0	76 5	88 0	48 9	71 7
June 26	14 5	52 2	89 7	48 9	71 7
Oct. 9	28 9	70 0	78 3	78 3	78 3
Nov. 29	60 8	88 2	79 8	78 3	
1917					
Jan. 11		88 2	83 1	78 3	
March 7		\$1 30 3	81 4	78 3	\$1 30 3
May 17		1 63	85 9		

The rates quoted for October 9th were those current immediately before the announcement of the appointment of the Royal Commission on wheat supply. Since then the rate for foreign steamers

from Buenos Aires has risen slightly while the rate from Karachi has more than doubled and is now \$1.52 a bushel higher than it was before the war. The figures are converted from pounds sterling at par.

THE COURSE OF THE PRICES OF WHEAT IN NORTH AMERICA

PRICES in three North American markets, New York, Chicago and Winnipeg, which on 9th October, the day before the announcement of the British Royal Commission for Wheat Supplies, were already at about the highest point they had reached since the commencement of the war, rose very rapidly until the middle of November, when the cash price of No. 2 Red Winter at New York was quoted at \$2.00 per bushel. During the following 30 days they fell almost as rapidly until on 15th December they were considerably lower than they had been on 9th October. After further violent fluctuations, they were of 6th March higher than they had been since the war began. After that date, prices rose by leaps and bounds, until on 11th May, May futures were quoted at Chicago at \$3.18 per bushel. On 12th May, July futures were quoted at Chicago at \$2.75, and September futures at \$2.45. On the same date, October futures were quoted at Winnipeg also at \$2.45. Then there was a rapid fall, and on 17th May, the quotations were — At Chicago, July futures \$2.19, September futures \$1.99, and at Winnipeg, October futures \$2.05 per bushel. On June 18th the quotations were: At Chicago July futures \$2.11, September futures \$1.85, and at Winnipeg, October futures \$1.98. The recent panic in America was no doubt

due partly to the certainty that the war would continue for some time, but mainly to the very unfavourable official estimate of the probable out-turn of the winter wheat crop in the United States, and to the realization of the fact that North America had sold to the Allies a larger quantity of good quality wheat than it was in a position to deliver, owing to the very poor quality of a large proportion of Canada's last harvest. This led to hoarding on a very large scale by merchants, farmers and consumers. The rapid fall which has taken place since 12th May in July and September futures at Chicago, and in October futures at Winnipeg, is no doubt largely due to the excellent prospects of the spring wheat crop, both in the United States and in Canada, and to the measures taken to improve the situation on the corn exchanges, chief among which are the announcements made by the British Government Agent at Winnipeg that he would accept low-grade non-contract wheat on May contracts, and the steps taken by the market authorities, both at Chicago and Winnipeg, to discourage for the time any buying of futures except for the purpose of closing existing contracts. The adjustment of the situation has further most effectively progressed by Government appointments of food controllers and in Canada of a Board of Grain Supervisors.

WHEAT PROSPECTS AFTER THE WAR

BY T. K. DOHERTY

THE opening up of the Dardenelles to Russian wheat after the war is generally expected to cheapen wheat considerably on the world's markets. This question is worthy of serious consideration. Assuming that peace be declared on August 1st next what would be the effect on the price of wheat?

Russia is reputed to have in stock from previous harvests large surpluses of wheat. These have been variously estimated at figures ranging around 200,000,000 bushels. These estimates, however, were made some time ago and were based more particularly on the large Russian crop of 1915. The crop of 1916 in the Russian Empire was 207,000,000 bushels less than that of the previous year, being 682,237,000 compared with 890,044,000. In fact it was only 32,000,000 bushels in excess of the average home requirements of the period 1909-13 which were 650,000,000 bushels.

The main consumer during the war has been the army, and the wastage has been enormous because of the abandonment of

supplies and the destruction of crops. Considering the great number of Russian prisoners in the hands of the enemy and the millions of men in the present home army, production has been very naturally reduced through lack of the customary labour, as the figures for 1916 show.

It is, moreover, to be recalled that while the crop of wheat in 1915 was large the crop of potatoes decreased by over 200,000,000 bushels in the Russian Empire, being 761,086,000 bushels compared with 965,314,000 in 1914. Here is a crop where the absence of labour had its immediate effect. There are no figures for 1916 for the potato crop but it is altogether likely that that crop has still further fallen off, as has been the case in France where a like reduction of labour has occurred. Hence, in the latter part of 1916 and during 1917 we have had frequent reports of famine at Petrograd, other Russian cities and in certain provinces.

The fact is, Russia has not, like Canada, an adequately extensive system of eleva-

tors to house any great proportion of its big crops for as long a period as a couple of seasons, as it has been generally assumed Russia is doing.

There is, however, a network of grain elevators organized in many internal governments by the State Bank, a Department of the Ministry of Finance. The preliminary programme of the ministry was approved by the State Duma in the sessions of 1912 and 1913 and involved an expenditure of some \$12,500,000. In 1912-13 the bank constructed new elevators aggregating a capacity of 4 million bushels. By 1915 the total had reached 12,480,000 bushels, and by 1916, through the acquisition by purchase, the State Bank had under its direct control thirty-five elevators having an aggregate capacity of 13,920,000 bushels. On June 17th, 1916, it was decided to erect for the grain districts of the North East and the South West and for the black earth district seventy-seven elevators and granaries of a capacity of 37,650,000. In July, 1915, there were in Siberia seventy-seven elevators with a storage capacity of 4,000,000 bushels. Under recent conditions it is questionable whether the bank has been able to proceed with its elaborate programme. All the elevators are at present under military direction.

It is not unlikely that farmers, finding the customary world's markets lacking, have very largely fed their surpluses of wheat to their stock. This view was not long since expressed by a leading representative of Russia at the headquarters of the International Institute, his opinion being that the surpluses would very probably be consumed in great part in view of the increased home consumption. The peasants would have been encouraged to increase their holdings of live stock which before the war had dwindled to a comparatively low figure. The total number of cattle in European Russia, which in 1905 was 39,000,000 head, had been in 1910 reduced to 37,000,000, and in 1913 to 34,000,000 head. Their sheep, which in 1905 numbered 53,000,000 head, had in 1910 been reduced to 45,000,000, and in 1913 further reduced to 41,000,000 head. Their porcine production only was maintained during this period, it being practically the same in 1913 as in 1903, namely, 13,000,000 head.

It is further recalled that Poland, and the other provinces cut off by the German invasion, produced, on an average of the five years ending 1909-13, 65,000,000 bushels of wheat and 623,000,000 bushels of potatoes. Doubtless the wheat production was very little more than sufficient to feed the population of these provinces, but the potatoes were certainly relied upon as food supply for the rest of Russia since, for the same five year period, the rest of European Russia only produced annually 295,000,000

bushels of potatoes. This fact would in part explain the recent complaints of the shortness of food, and renders quite improbable the supposition that large Russian supplies of wheat are being held for export after the declaration of peace.

On a ten-year average before the war Russia exported annually 128,000,000 bushels of wheat, and that would seem to be not an unreasonable quantity to estimate as the probable export in the first season following the declaration of peace, should such a declaration be made by the 1st of August or even within the present calendar year. Mr. Richardson, the director of agriculture for Australia, in May 1916 estimated the requirements of Germany and Austria in such a contingency to be 193,000,000 bushels. In view of the failure of the crops in the enemy countries during the current season, it is probable that that estimate would have to be materially increased. Then, not only have German and Austria-Hungarian territory been placed under commission for the supply of German needs, but Roumania, Poland, and the other invaded Russian states and the Balkan states have been tributary to them, and these latter states, far from having any grain to spare, will probably need to import wheat to replenish their supplies.

Considering, therefore, the whole European situation, and particularly that likely to obtain in the countries just referred to, there does not appear to be any probability that the prices for wheat will be at all comparable with those prevailing before the war. High prices will persist for some time just as they did after the termination of other great wars.

There are, however, points of secondary importance to be considered, which might have a tendency towards the lowering of prices. There would be a reduction in the European population that would be quite notable in the enemy states. Many of the people will have become accustomed to consume less wheat than before the war and might continue the economy they have learned to practice. No doubt they would also be deterred from foreign purchases owing to the depreciation of their paper currency, the lowness of the present maximum price of wheat to which they have become accustomed and which, measured in gold, is much below the price prevalent in the world outside.

In France and Italy as the price of wheat has, by the action of the governments, been kept much below the real world's price, one may expect these countries to import as little wheat as possible until the world's price falls to the level at present prevalent in these countries. In Germany and Austria-Hungary, with supplies of wheat exhausted, although their requirements may be very urgent the existing high price, measured in gold, has been kept so much

below that prevalent in the world outside that if they are to obtain wheat from abroad they must pay for it a price, whether measured in gold or in depreciated paper, very much above the price at present in force in these countries.

Altogether then, when peace is declared it is possible that the demand of the importing countries may not be either so urgent or so large as might be thought probable on the supposition that they would at once demand as much wheat as was necessary to build up their usual

stocks and restore their normal rate of consumption. No doubt some of the exporting countries, for instance Australia and Russia will be anxious to get rid of their supposed embarrassing accumulated surpluses, but the world's demand, quite equal to if not in excess of supply, will stiffen their prices.

Then again the course of prices will greatly depend on the cost of transportation. The present rates of ocean freights compare as follows, with those current before the war, for wheat:

New York to Liverpool.
Karachi to Liverpool
Buenos Aires to Liverpool
Australia to United Kingdom (sailer)

\$ 60 8	compared with	4 8	cts.
1 63	"	10 9	"
85 9	"	8 4	"
1 30 3	"	17 0	"

According to the statistics at hand it appears that the number of British steamers of 1600 tons and upwards has fallen from 3,900 at the beginning of the war to about 3,240 now (June 23rd), a net loss of 16.9%. Lord Curzon, in the House of Lords on May 10th, said that at the end of June 1914 Britain possessed 10,124 steamers of 100 tons and upwards with a tonnage of 20.5 millions. In December 1916 the number was 9,757 steamers with a tonnage of 19.8 millions, a net loss since the war began of 367 steamers and only 0.7 million tons. The corresponding figures for all other countries were in June 1914, 14,320 steamers of 24.9 millions, and in December 1916 13,749 steamers of 24 million tons. Therefore, taking only vessels of 1600 tons gross and upwards, Britain had in June 1914 just short of 3900 steamers with a gross tonnage of 16.9 million tons, or more than one-half the effective tonnage of the world. At the present date the number is about 3,240. A United States maritime expert on June 21st estimated Germany had sunk two million tons of British ships since the unlimited submarine warfare was declared on February 1st. From all the reliable statistics to hand it would appear that the world's steam merchant shipping has fallen from 24,444 steamers of 45.4 millions tons, at the end of June 1914, to 23,506 steamers of 43.8 million tons at the end of December 1916, a net loss up to that date of 938 steamers and of 1.6 million tons, or nearly 4% of the number of steamers and 3½ per cent in total tonnage.

While the sinking of merchant vessels has been very large, the construction of new vessels is proceeding at an accelerating pace. Speaking at the Guildhall on April 27th the British Prime Minister stated the Shipping Director had made such arrangements that there will be three times, if not four times as many new ships this year as there were last, and it expected that even should the losses continue at the same rate the British would bring more tonnage into their ports on July 1st than they did in March. This prediction has been fully realized. The percentage of grain vessels

lost is surprisingly small in comparison with the actual total tonnage arriving week by week.

In addition to the speedy production of vessels in England it is known that over 100 vessels ranging from 250 to 6000 tons were under construction in Canada as early as March last; moreover, that in the United States during the year 1916 about 1200 vessels of a tonnage of about 600,000 had been turned out, or more than double the previous year's output. It is estimated that from five to six million tons of steel and wooden vessels could be constructed by the United States government in the next two years. As a matter of fact on December 1st last there were building and under contract vessels with aggregate tonnage of 1,200,000 the largest total ever reported in the country's history.

It seems therefore probable that at the end of the war or soon after the total tonnage of merchant shipping in the world will be at least as large as it was on the average of the five years before the war. Germany's interned and laid-up shipping, with gross tonnage of approximately 4 million tons, or nearly one-tenth of the world's gross tonnage, will immediately become available and make an important addition to the supply of shipping for general purposes of trade. On the whole then it seems probable that for some considerable time after the declaration of peace the world's demand for shipping might be about the same as it was on the average of the five years before the war, while the world's supply of shipping will be as large as it was on the average of those five years. The rates of ocean freight then may be expected soon to fall from the present abnormal figures. War risk insurance will cease, and this in itself will reduce the price of imported wheat. The fall in ocean freight rates, taken by itself, will tend to lower prices in importing countries, and to raise them in exporting countries.

It is an open question whether the available supplies of gold and the continued production of gold during the war will have the effect of enhancing the prices of cereals

as well as of other commodities. This question, however, need not be discussed here.

Putting all of these considerations together, it seems probable that soon after the declaration of peace there will be a fall in the rates of ocean freight, a probable fall in the price of wheat in the United Kingdom, a rapid rise in Germany and Austria, and perhaps a continuation of the present prices in France and Italy, where the requisition prices have recently been raised, as well as in Russia where the prices fixed by the government are now well above the pre-war average, perhaps a slight tendency

towards lower prices in North America and the Argentine, and prices comparatively firm in India and Australia where shipping would be available for marketing their grain.

PRICES OF WHEAT MEASURED IN GOLD

International prices are gold prices, and as the prices in the month of May in many countries were fixed in terms of much depreciated paper currency, it is important to consider what they were when translated into terms of gold. This will be seen from the following statement:

COUNTRY	Average Price Before the War after Deduct- ing import duty, Dollars per Bushel	Approximate Price, May, 1917
IMPORTING COUNTRIES:		
Great Britain and Ireland	\$1 06	\$2 43
France	0 97	1 76
Italy	1 06	1 46 old crop
		1 76 new crop
Germany	0 97	1 28
Austria	1 13	1 09
EXPORTING COUNTRIES:		
United States (Chicago)	0 91 May	3 22 May
		2 22 July
Canada	0 91 October	2 07 Oct.
India (Bombay or Karachi)	0 94	1 22
Argentina (Buenos Aires)	0 94	2 09
Australia (Melbourne)	0 91	1 16
Russia	1 00	1 19 to 1 58

From this comparison it will be seen that while, measured in gold, the price in May of wheat in Great Britain, the United States, Canada, and the Argentine, was more than double its normal price before the war, in France, Italy, India and Australia, where the government have for some time back practically fixed the price, the rise, measured in gold, is not nearly so

great, and in Germany and Austria, where the price has been fixed in inconvertible and depreciated paper currency, the present price, measured in gold, is very much below the current price in the world outside. The price in Russia has recently been raised by the government, and it is now, measured in gold, considerably higher than it was before the war.

CABLED CROP REPORT

A cablegram received from the International Institute of Agriculture on June 26th gives the following crop data:

The wheat crop of France is provisionally estimated at 161,674,000 bushels, or 75% of the 1916 crop. Wheat production of India 379,309,000 bushels, or 119% of last year and 105% of the average of the five years 1911-15. Japan's wheat crop is estimated at 26,533,000 bushels, or 94% of the 1916 crop and 108% of the five years' average.

The area sown to wheat in Italy is 10,26,000 acres, 91% of last year's acreage and 89% of the five year's average; India 33,041,000 acres, or 110% of 1916

and 108% of average; Tunis 1,310,000, or 88% of 1916 and 102% of average.

Area sown to barley: France 1,475,000 acres, or 95% of 1916; Italy 544,000, or 91% of 1916 and 89% of average; Tunis 1,038,000, or 84% of 1916 and 92% of average.

Area sown to oats: France 6,437,000 acres, or 83% of 1916; Scotland 1,040,000, or 105% of 1916 and 109% of average; Italy 1,137,000, or 130% of 1916 and 92% of average.

The condition of cereal crops on June 1st was good in Ireland and Italy, average in India, Egypt and moderate in France, Great Britain, Luxemburg, Netherlands, and Switzerland.

BROOMHALL'S FOREIGN CROP CABLE, JUNE 26th

Australia—Weather has improved, with showers in dry districts. In New South Wales the acreage is large, but elsewhere loss has been sustained. Crop prospects are about normal. Large reserves are reported.

France—Crop prospects have improved, with good rains and high temperatures. Great efforts are being made to plant a large acreage to corn and forage crops, and it is hoped this will minimize the food shortage. Complaints of scanty supplies of wheat are general and many mills running half time.

Spain—Good weather prevails and crop prospects excellent. Large acreage offsets some damage from drouth. Argentine wheat arriving and recent purchases amounted to 1,250,000 bushels. Government now buying in Australia.

Italy—General crop promise fair. Harvesting has commenced in Sicily and yield favourable with quality excellent. Stock

small and foreign arrivals light.

United Kingdom—Weather warm and occasional showers, which is beneficial. Acreage smaller than last year. Oats prospect fine.

Scandinavia—Crop results are expected to be poor owing to severe winter which resulted in much loss. Prices high.

Balkan States—Weather has been favourable and it is expected the yield will be fair to good.

North Africa—Generally favourable prospects prevail, with weather good.

Germany—Neutral reports are unanimous in reporting prospects distinctly poor. Very cold winter with scarcity of snow and late cold spring and later dryness.

Russia—Weather fine, clear and warm. Drouth reports continue from Odessa. Interior movement light as scarcity of supplies are noted and railway traffic blocked.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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CONTENTS

	PAGE
The Work of The Agricultural Instruction Act.....	647

PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Agricultural Instruction Act.....	650
Appropriations to the Provinces Under The Agricultural Instruction Act.....	651
The Dominion Experimental Farms:—	
The Division of Horticulture:	
Plant Breeding Work at the Central Experimental Farm, by A. J. Logsdaile	656
The Dairy and Cold Storage Branch: -	
Loss of Fat in the Whey when using Pepsin, by Geo. H. Barr ..	660
The Entomological Branch: -	
The Relation of Soil Insects to Climatic Conditions, by Alfred E. Cameron	663
The Live Stock Branch:—	
The Record of Performance, by C. S. Wood.....	669
The Seed Branch:—	
Screenings in Mill Feeds, by J. R. Dymond	672
Dominion Department of Agriculture Honour Roll:—	
Further List of the Employees of the Department of Agriculture who have Enlisted for Overseas Service	673

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Distribution of Eggs to the School Pupils:—	
Quebec, by Br. M. Ligouri	674
Macdonald College, by M. A. Jull	675
Ontario, by R. S. Duncan	676
Ontario, by J. B. Dandeno	677
Manitoba, by S. T. Newton	678
Alberta, by A. W. Foley	679
Prince Edward Island:—	
Recent Agricultural Legislation	681
New Brunswick:—	
Recent Agricultural Legislation	682
District Representatives and other Appointments, by W. R. Reek	683
Nova Scotia:—	
Agricultural Instruction Activities, by J. G. Archibald	684
Ontario:—	
Apiculture Summer Course, O. A. C., 1917	685
Farmers' Automobile Tour	686
Short Courses for Live Stock and Field Crop Judges	686
Live Stock Judging Competitions, by C. F. Bailey	687
Improving the Potato Industry in Ontario, by R. S. Duncan	688
Summer Pruning the Young Apple Orchard, by E. F. Palmer	689
District Representatives Conference	691
Manitoba:—	
Crop Report for the First Half of the Year	694
Ploughing Matches and Demonstrations, by S. T. Newton	695
Summer-Fallow Competitions, by S. T. Newton	697
Saskatchewan:—	
Junior Agricultural Service League	698

PART III

RURAL SCIENCE

	PAGE
Agricultural Equipment in Public Schools:—	
Prince Edward Island, by J. E. McLarty.....	699
New Brunswick, by R. P. Steeves.....	700
Ontario, by J. B. Dandeno.....	701
Saskatchewan, by A. W. Cocks.....	701
Alberta.....	703
British Columbia, by J. W. Gibson.....	704
Scholarships for Household Science:—	
New Brunswick, by Miss Hazel E. Winter... ..	706
Saskatchewan.....	706
British Columbia, by W. E. Scott... ..	707
Ontario:—	
Agricultural Teaching in the Public and Separate Schools.....	707
Manitoba:—	
Summer Course in Agriculture for Teachers.....	708
Saskatchewan: -	
Exhibition of School Garden Products. . .	709
The School Fair and Rural Citizenship, by J. T. M. Anderson	709
British Columbia:—	
School Gardening in the Province... ..	711

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Acts Relating to Agriculture:—	
Cold Storage.....	712
The College and Rural Leadership, from Annual Report of Prof. J. B. Reynolds	713
The Organization of Resources Committee in Ontario . .	715
Official Weights of Vegetables, Grains and Seeds	717
Associations and Societies.	717
New Publications... ..	721
Notes.	723
Index to Periodical Literature	726

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence.	727
Science and Practice of Agriculture	727
Crops and Cultivation.	728
Live Stock and Breeding.	732
Rural Economics	735
Agricultural Industries.....	736
Plant Diseases.	737
Injurious Insects.	737
Agricultural Training for Partially Disabled Belgian Soldiers.....	738
Department for Civil and Military Vegetable Gardens in France... ..	739
Settling Discharged Soldiers on the Land in New Zealand.	740
Contents of the Institute Economic Bulletin.....	741
Agricultural Statistics:—	
Foreign Crop Conditions	741
Production, Trade and Consumption of Oats, Barley and Rye in Certain Countries for the Years 1916-17 Compared with the Five-Year Period Before the War	742
Imports of Cereals into Belgium :	746
Cabled Crop Report.....	746

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THE WORK OF THE AGRICULTURAL INSTRUCTION ACT

UNDER THE AGRICULTURAL INSTRUCTION ACT of 1913 the sum of ten million dollars was set apart to be available during the ten years ending March 31st, 1923. The Act has now been in operation for four years and has contributed the sum of \$3,400,000 to the provinces to advance the farming industry. With the year 1917-18 the grants to the provinces reach their maximum, there to remain until the completion of the period.

In the total grant for the four years the provinces have participated as follows:—

Ontario	\$993,774.24	Nova Scotia	258,294.05
Quebec	805,414.49	New Brunswick	207,435.13
Manitoba	244,994.02	Prince Edward Island..	113,944.69
Saskatchewan	258,329.40	Veterinary Colleges	80,000.00
Alberta	215,681.40		
British Columbia.. . . .	222,132.58	Total	\$3,400,000.00

The purpose of the Act, put briefly, is to assist the provinces by grants of money to carry on educational and instructional work for the benefit and encouragement of agriculture. The framers of the Act were of opinion that education and instruction for the farming community might best be classified under four divisions, and these were the lines of work agreed upon:

(1) The teaching, in the public school, of the first principles of the sciences related to agriculture;

(2) The teaching of more advanced agriculture in agricultural colleges and schools, designed, more particularly, to train teachers, investigators and community leaders;

(3) The carrying on of extension work involving the instruction of farmers by acquainting them with the results of scientific investigation and research; and,

(4) The amelioration of the conditions of rural life, particularly in-so-far as women and children are concerned.

To assist the provinces in working out the programme outlined and for the guidance of those charged with the undertaking, a schedule was prepared at the inception of the work setting forth the objects that would be regarded as coming within the scope of the Act. The objects suggested were numerous and, while keeping within the scheme outlined, they afforded each province an ample opportunity for selection, so as to

meet individual needs and requirements.

While any form of work included or indicated in the schedule as intended to give effect to the purpose of the Act might be selected, it was left to the Dominion Minister of Agriculture to decide as to the suitability of the undertakings proposed. To enable him to do so, an outline of each year's work is submitted. If the objects named are regarded as coming within the scope of the Act, and their efficiency and sufficiency are conceded, a formal agreement is entered into whereby a province undertakes to expend the grant for the objects named. Apart from the specific authorization for expenditures contained in the annual agreement, it may be stated, in a general way, that the appropriations cover salaries, expenses and the purchase of such materials and equipment as are regarded as essential to carry out efficiently any line of work agreed upon.

To confer with provincial officials, to advise with them, to inspect the work, to see that the moneys are expended in accordance with the intention of the Act, and to report to Parliament on the proceedings under the Act, are the duties pertaining to the office of Commissioner. In order to get in touch with provincial officials and to observe the work being carried on, visits are made from time to time to all the provinces. Not only is co-operation between the Departments, Dominion and Provincial, promoted in this way, but unintentional departures from the spirit of the Act are avoided. Particularly where changes of Government take place are conferences necessary with incoming officials to insure a full understanding of the purposes of the Act and of the methods by which those purposes may be made effective.

As to the efficiency with which the work has been carried out and as to the quality of the results, it is difficult with so great a range of

activities and so wide a field, to speak except in general terms. The conclusions in the main are distinctly favourable. In some few cases, the organization of provincial Departments has not been sufficiently complete to insure the best results. In other cases changes of Government and policy have been limiting factors, while in a number of instances the work has suffered from the loss of trained agriculturists due to the closer inspection and war, and indirectly in other ways from the same cause. More frequent consultation would undoubtedly tend to make the work of some of the provinces more effective and to promote co-operation. The extent of the territory to be gone over and the shortness of the season during which observation is practicable make this difficult, but its importance is such as to justify the increased attention that is being paid to these phases.

The following brief summary of from the total grant. About one-third of the grant, (\$245,000) has been devoted to the schools and the work performed by the various provinces will indicate the objects upon which the funds provided by the Federal grant have been expended up to the present time:

In the province of Ontario, the work carried on by the Provincial Department of Agriculture at the time the Act came into effect was for the utmost part educational in its character. The one million dollars contributed by the Federal grant has been employed chiefly in extending existing lines of work, such as that comprising district representative system, in improving facilities in the way of buildings at the Ontario Agricultural College and in promoting the teaching of agriculture in the public schools.

To assist the Department of Agriculture of the province of Quebec to give instruction to the farming population in approved agricultural methods, \$492,000 has been allotted

colleges of agriculture, and the balance, (\$69,000) has been assigned to the teaching of agriculture in academies, rural and normal schools, and to instruction in domestic science in convent schools.

In Manitoba, the Extension Service of the Agricultural College has been largely developed with the moneys supplied by the grant. This service embraces in its activities the district representative system, the boys' and girls' club movement, agricultural short courses, home economics, society supervision and short courses, instruction trains and automobile lecture tours. Other phases of work include the establishment of a permanent farm for the demonstration of general agriculture and fruit-growing.

Saskatchewan divides the grant between the College of Agriculture and the Departments of Agriculture and Education. The teaching staff of the College of Agriculture has been greatly strengthened in order to enable the institution to turn out men well equipped for agricultural leadership. The balance of the grant to the institution promotes College Extension system and research work. The work carried on by the Department of Agriculture includes instruction in creamery work, education in co-operation and marketing and the operation of "better farming trains." The work of the Department of Education in respect to the teaching of elementary agriculture and household science is financed by the grant.

The greater portion of the grant to the province of Alberta has been expended on the equipment, operation and maintenance of the three Schools of Agriculture, and household science. The object of these schools is to supply a form of education adapted to the needs of boys and girls from the farm. About five hundred students have passed through the schools since their establishment three years ago.

Federal assistance to agriculture

in British Columbia has enabled the Provincial Agricultural Department to greatly extend instructional work among farmers. Demonstrations in field crops and horticulture, dairying, poultry-keeping, silo construction and vegetable growing and storing have been carried out; co-operative variety tests and competitions in production for boys and girls, as well as for their seniors, have been organized. The grant has greatly assisted the work of women's institutes, while the organization of marketing and the extension of publicity have been made practicable. The movement to establish agricultural and domestic science teaching in the schools owed its inception, in 1914, entirely to the influence of the federal grant, which has since defrayed a large part of the cost of the undertaking.

In the province of Nova Scotia, about forty-five per cent of all the work done under the Department of Agriculture, including the Agricultural College may be credited, in-so far as it is represented by moneys expended, to the Federal grant.

At the time The AGRICULTURAL INSTRUCTION ACT went into effect, there were no facilities in New Brunswick for teaching agriculture. The grant has either provided or equipped Schools of Agriculture, has increased the staff of instructors, promoted the interests of farm women and opened the way for a marked advance in connection with the teaching of elementary agriculture in the schools of the province.

Prior to the passing of the Act, no instructional or educational work had been undertaken in Prince Edward Island, neither had the province any staff of men trained for such work. nor the buildings and equipment necessary to its successful prosecution. Requirements in these respects are now being met to a great extent, while the organization of women's institutes and the extension of agricultural teaching to the public schools are entirely due to the assistance derived from the grant.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE AGRICULTURAL INSTRUCTION ACT

THE following is the form of agreement entered into by and between the Hon. Martin Burrell, Minister of Agriculture for Canada, and each of the nine provinces of the Dominion, under the provisions of THE AGRICULTURAL INSTRUCTION ACT of 1913, the appropriation to each province and the work to be undertaken by each during the fiscal year ending March 31st, 1918:—

FORM OF AGREEMENT

MEMORANDUM OF AGREEMENT made and entered into by and between the Honourable

Minister of Agriculture for Canada, hereunto authorized by Order of his

bearing date the day
of 19

Party of the First Part;

AND

The Government of the Province of herein represented by the Honourable

for said Province, hereunto authorized by Order of His Honour the Lieutenant-Governor of said Province in Council, bearing date the day
of 19

Party of the Second Part,

WHEREAS, under the terms of THE AGRICULTURAL INSTRUCTION ACT, for the purpose of aiding and advancing the farming industry by instruction in agriculture, there shall be paid out of the Consolidated Revenue Fund of Canada to said Province, during the Fiscal Year ending the 31st day of March, 19 , the sum of

and

WHEREAS, it is provided in said Act that the payment of said moneys shall be conditional upon agreement between the Minister of Agriculture and the Government of said Province as to the terms, conditions and purposes within the meaning of said Act, upon and for which the payment of said moneys is to be made and applied.

NOW, THEREFORE, the said parties have mutually agreed that the said moneys shall be paid upon the terms and conditions and shall be applied to the purposes hereinafter set forth, to wit:—

1. One-half of said moneys shall be paid to said Party of the Second Part by said Party of the First Part on the execution of these presents.

2. The balance of said moneys shall be paid to said Party of the Second Part by said Party of the First Part, from time to time, upon the latter being satisfied that said

moneys have been and are being properly expended for the purposes for which said moneys were paid, as hereinafter provided.

3. The said Party of the First Part shall have at all time the right through such officers of his Department or other persons as he may designate or appoint for the purpose, to inspect any work carried on through the assistance of said moneys and may withhold any further payment on account of the same if, in his opinion, the conditions of this agreement are not being fulfilled.

4. The said moneys shall be expended for and applied to the following purposes, the amount to be expended for each purpose being that set opposite the same, to wit:—

5. Should it hereafter at any time be determined that any of the amounts as aforesaid for any of the foregoing purposes can with advantage be varied, then by mutual consent of the parties hereto the same shall be varied accordingly.

6. The Party of the Second Part shall render to the Party of the First Part such statement of the expenditure of said moneys as may be required from time to time by the said Party of the First Part.

7. It is understood that the moneys granted by this agreement are intended to supplement the amounts devoted to agriculture by the Province itself, and are in no wise to be used for the purpose of curtailing the customary provincial expenditure in aid of agriculture.

IN WITNESS WHEREOF, the said Party of the First Part has hereunto set his hand and the Seal of said Department of Agriculture, at the City of Ottawa, this day of 19 .

AND IN WITNESS WHEREOF, the said Party of the Second Part has hereunto set his hand and the Seal of the said Province, at the City of in said Province, this day of 19 .

APPROPRIATIONS TO THE PROVINCES UNDER THE AGRICULTURAL INSTRUCTION ACT

PRINCE EDWARD ISLAND

A. BUILDINGS ACCOUNT

1. Agricultural Buildings—Equipment and Maintenance.	\$2,950.00
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B. INSTRUCTION AND DEMONSTRATION

2. Director and District Representatives.	7,900.00
3. Short Courses.	250.00
4. Drainage and Soils.	500.00
5. Dairying.	2,600.00
6. Bee-keeping and Fruit Growing.	1,300.00
7. Women's Institutes, Household Science, Short Courses, Grants and Allowances.	3,500.00

C. ELEMENTARY AGRICULTURAL EDUCATION

8. Agricultural Instruction in Public and High Schools, Training Teachers, Allowances, Grants, Maintenance of Rural Science Department, Prince of Wales College.	10,500.00
9. Miscellaneous and Contingencies, including clerical assistance.	2,249.22

Total.	\$31,749.22
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Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which the said publications relate.

NOVA SCOTIA

1. Colleges and Schools of Agriculture: Capital—Science Building, Construction and Furnishings, Interest and Sinking Fund.	\$8,000.00
2. Salaries and Maintenance.	23,000.00
3. Demonstration and Instruction: District Representatives.	7,500.00
4. Short Courses: Demonstration Buildings, Maintenance, Allowances to Students	3,000.00
5. Dairying.	3,500.00
6. Poultry.	1,500.00
7. Bee-keeping: Educational Work.	1,500.00
8. Drainage: Demonstration and Soil Survey	2,500.00
9. Soils and Fertilizer Demonstration	500.00
10. Field Crop Demonstration.	2,000.00
11. Fruit Growing.	2,000.00
12. Women's Work: Institutes and Clubs, Domestic Science Short Courses and Allowances.	3,000.00
13. Entomological Work: Horticultural and Entomological Investigation, and Education re Insect Pests.	10,000.00
14. Elementary Agricultural Education: Agricultural Instruction in Public, High and Normal Schools, Training of Teachers, Allowance and Grants.	10,000.00
15. Schools Children's Exhibits and Competitions	2,000.00
16. Contingencies and Miscellaneous	1,716.69
Total	\$81,716.69

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which the said publications relate.

NEW BRUNSWICK

A. AGRICULTURAL SCHOOLS

1. Capital Account: Construction, Equipment, Furnishings, Agricultural and Dairy Schools	\$1,000.00
2. Salaries and Maintenance	3,000.00

B. INSTRUCTION AND DEMONSTRATION

3. District Representatives.	8,000.00
4. Bee-keeping.	500.00
5. Soils and Drainage	4,000.00
6. Horticulture.	5,500.00
7. Short Courses	3,500.00
8. Live Stock	7,000.00
9. Dairying	4,000.00
10. Poultry.	1,600.00
11. Fertilizers	3,000.00
12. Entomology.	1,000.00
13. Young People's Club	2,000.00
14. Agricultural Societies.	4,000.00
15. Women's Institutes.	4,500.00

C. ELEMENTARY AGRICULTURAL EDUCATION

16. Agricultural Instruction in Public, High and Normal Schools, Household Science, Training of Teachers, Allowances, Grants.	9,785.80
17. School Fairs.	1,725.00
Total.	\$64,110.80

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which said publications relate.

QUEBEC

A. COLLEGES AND SCHOOLS OF AGRICULTURE

1. Grants and Allowances: Macdonald College, Ste. Anne de la Pocatière, School of Agriculture, Oka Institute.....	\$75,000.00
2. School of Veterinary Science, Building Extension.....	5,000.00

B. DEMONSTRATION AND INSTRUCTION

3. Breeding: Educational Work in Horse-Breeding, and Cattle-raising. . .	7,000.00
4. Poultry: Instruction and Demonstration.....	18,000.00
5. Bacon: Instruction.....	5,000.00
6. Horticultural and Entomological Work.....	30,000.00
7. Experimental and Demonstration Orchards.....	5,000.00
8. Dairying, Educational Work in Cheese and Butter.....	25,000.00
9. District Representatives.....	40,000.00
10. Seed Selection, Clover Plots and Demonstrations.....	9,000.00
11. Bee-keeping, Instruction.....	7,000.00
12. Drainage, Instruction and Demonstration.....	8,000.00
13. Maple Industry: Maintenance of Schools and Allowances to Students..	4,000.00
14. Short Courses, Lectures.....	9,113.76
15. Experimental Union, Investigation Work, Field Crops.....	2,000.00

C. ELEMENTARY AGRICULTURAL EDUCATION

16. To Promote the Teaching of Agriculture in Academies, Rural and Normal Schools, Training of Teachers, School Gardens.....	10,000.00
17. To Promote the Teaching of Domestic Science in Academies and Normal Schools, Grants and Special Lectures.....	10,000.00
18. School Children's Exhibits and Competitions.....	2,000.00

\$271,113 76

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which said publications relate.

ONTARIO

AGRICULTURAL COLLEGES AND SCHOOLS

1. Ontario Agricultural College:	
(a)* Buildings, Equipment and Furnishings.....	\$75,000.00
(b) Salaries and Expenses, Additions to Staff, Maintenance.....	15,000.00
	\$90,000.00
2. Agricultural School: Capital Expenditure including Land Purchase, Buildings and Equipment, and the services and expenses pertaining thereto.....	50,000.00

INSTRUCTION AND DEMONSTRATION

3. District Representatives: including Clerical and other Assistance in connection with the Administration.....	120,000.00
4. Co-operation and Markets: Educational Work in connection with the Marketing of Farm Products, including Organization of Co-opera- tive Societies.....	4,500.00
5. Demonstration and Instruction in Vegetable Growing.....	6,000.00
6. Stock and Seed-Judging, Short Courses and Institute Lectures.....	2,500.00
7. Women's Institute Work, including Courses in Cooking, Sewing, etc. . .	7,500.00
8. Short Courses for Fall Fair, Field Crop and Poultry Judges: including travelling and living expenses.....	4,703.26
9. O.A.C. Short Courses for Winners of Acre Profit and Live Stock Compe- titions, including travelling and living expenses.....	3,000.00
10. Lectures on Horticulture.....	800.00
11. Demonstrations with Vegetables and Hardy Fruits in New Ontario.. .	1,000.00
12. Vineland Horticultural Experiment Station: Experimental Work.....	2,500.00
13. Drainage Work.....	6,500.00
14. Demonstration Work on Soils.....	4,500.00
15. Bee-keeping.....	800.00
16. Instruction and Special Educational Work in Growing and Handling Corn.....	2,000.00

ELEMENTARY AGRICULTURAL EDUCATION

17. To provide for and to encourage the teaching of Agriculture, Manual Training as applied to work on the farm, and Domestic Science in High, Public, Separate and Continuation Schools and in Universities, to be available for grants, services, expenses and equipment, and travelling and living expenses of teachers, inspectors and others in attendance at short courses or other educational gatherings, and to be paid out on the recommendation of the Department of Education . . .	30,000.00
	<hr/> \$336,308.26

*To complete programme of building decided on in 1912.

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which said publications relate.

MANITOBA

INSTRUCTION AND DEMONSTRATION

1. Killarney Demonstration Farm (maintenance)	\$3,000.00
2. Dairy Work: Instruction in outlying districts; grading of products for instructional purposes	8,000.00
3. Poultry Work	4,000.00
4. District Representatives	17,000.00
5. Boys' and Girls' Clubs	17,000.00
6. Short Courses in Agriculture	19,113.11
7. Home Economics: Instruction in Domestic Science including Short Courses	17,000.00
8. Soil Analysis and Survey	1,000.00
9. Bee-keeping	2,000.00
10. Miscellaneous	1,000.00
	<hr/> \$89,113.11
Allotment for 1917-18	\$77,113.11
Unappropriated balance from 1916-17.	12,000.00
	<hr/> \$89,113.11

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, may be charged against the sub-division to which said publications relate.

SASKATCHEWAN

A. COLLEGE OF AGRICULTURE

1. Staff: Salaries, Research and Extension Service	\$22,076.16
2. Women's Work: Homemakers' Clubs	5,500.00

B. INSTRUCTION AND DEMONSTRATION

3. Co-operation and Marketing	4,500.00
4. Animal Husbandry: including Veterinary Instruction	4,500.00
5. Dairying	4,800.00
6. Field Husbandry and Weed Control	5,000.00
7. Demonstration Trains	4,776.16
8. District Representatives	2,500.00
9. Veterinary Short Courses	500.00

C. ELEMENTARY AGRICULTURAL EDUCATION

10. Agricultural Instruction in Public, High and Normal Schools; Household Science; Training of Teachers; Nature Study; School Gardens . . .	25,000.00
11. School Fairs	2,576.16
	<hr/> \$81,728.48

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which said publications relate.

ALBERTA

A. SCHOOLS OF AGRICULTURE

1. Maintenance, Salaries, Expenses.....	\$35,000.00
2. Equipment.....	2,000.00

B. INSTRUCTION AND DEMONSTRATION

1. Demonstration Farms: Buildings, Purchase of Stock.	8,000.00
2. Demonstration Trains.....	5,000.00
3. Dairying: Dairy Competitions and Prizes.....	1,500.00
4. Publicity: Printing and Publication of Bulletins.....	2,400.00
5. Women's Work.....	4,500.00
6. District Agents.....	8,500.00
7. Miscellaneous.....	65.62

\$66,965.62

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which the said publications relate.

BRITISH COLUMBIA

A. INSTRUCTION AND DEMONSTRATION

1. Agricultural and Horticultural Instructors and District Representatives.....	\$3,500.00
2. Field Crop Demonstration Stations.....	8,000.00
3. Horticultural Demonstration Stations.....	3,000.00
4. Poultry Demonstration Stations and Egg-laying Contests.....	1,500.00
5. Alfalfa Plots.....	500.00
6. Silo Demonstrations.....	3,000.00
7. Drainage Demonstrations.....	1,000.00
8. Seed Distribution and Co-operative Variety Tests, Seed Production, Seed Fairs.....	5,500.00
9. Dairying: Cow-testing Associations.....	3,000.00
10. Bee-keeping.....	2,500.00
11. Field Crop Competitions.....	2,000.00
12. Boys' and Girls' Clubs.....	1,000.00
13. Fruit-packing Schools and Demonstrations.....	1,000.00
14. Market Work.....	4,500.00
15. Agricultural Journal; Publications Branch.....	5,000.00

B. INVESTIGATION AND RESEARCH

16. Pathological and Entomological Investigation and Research.....	2,000.00
17. Weed Investigation and Survey.....	1,500.00

C. ELEMENTARY AGRICULTURAL EDUCATION

18. Agricultural Instruction in Public, High, and Normal Schools, Household Science, Training of Teachers, Grants.....	20,000.00
19. Contingencies and Miscellaneous.....	699.06

\$69,199.06

Each appropriation may include services, expenses and equipment.

NOTE:—Cost of preparing and printing bulletins and circulars, if undertaken, to be charged against the sub-division to which said publications relate.

RECAPITULATION OF APPROPRIATIONS

	1913-14	1914-15	1915-16	1916-17	1917-18
Prince Edward Island.....	\$26,529.85	\$27,832.81	\$29,138.28	\$30,443.75	\$31,749.22
Nova Scotia.....	54,288.45	61,144.45	68,001.87	74,859.28	81,716.69
New Brunswick.....	44,509.93	49,407.20	54,308.40	59,209.60	64,110.80
Quebec.....	159,482.40	187,409.16	215,310.70	243,212.23	271,113.76
Ontario.....	195,733.32	230,868.83	266,013.64	301,158.45	336,303.26
Manitoba.....	51,730.05	58,075.45	64,421.81	70,767.21	77,113.11
Saskatchewan.....	54,296.29	61,152.31	68,011.04	74,869.76	81,728.48
Alberta.....	46,094.95	51,310.41	56,528.82	61,747.22	66,965.82
British Columbia.....	47,384.76	52,799.38	58,265.94	63,732.50	69,199.06
Veterinary Colleges.....	20,000.00	20,000.00	20,000.00	20,000.00	20,000.00
Total.....	\$700,000.00	\$800,000.00	\$900,000.00	\$1,000,000.00	\$1,100,000.00

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

PLANT-BREEDING WORK AT THE CENTRAL EXPERIMENTAL FARM

BY A. J. LOGSDAIL, B.S.A., ASSISTANT IN PLANT BREEDING

THE work in plant improvement in the Horticultural Division of the Central Experimental Farm is necessarily limited to a few crops of prior importance. At present the work is chiefly confined

lings resulting from an original cross between the English gooseberry, *Ribes Grossularia*, and the native species of *Ribes Cynosbati* and *Ribes oxycanthoides*. A number of the bushes are yielding medium large to



A VIEW OF THE BREEDING PLOTS. SELECTIONS OF PEAS IN THE FOREGROUND, STRAINS OF SWEET CORN IN THE REAR

to the production of early-maturing strains of sweet corn and tomato and the selection of types for yield and quality with such crops as peas and beans. Plant improvement work is also being carried on with tree and bush fruits and during the past season some promising gooseberry seedlings have fruited, these seed-

even large fruits, though the best quality has, so far, been found on two bushes bearing medium to medium small sized fruits.

Some promising strawberry seedlings have been secured from crosses previously made between our native species, *Fragaria virginiana*, and several of the cultivated varieties

that have succeeded best at Ottawa. The ideal, or object, in strawberry work is to secure, if possible, a variety yielding fruit as large as the average commercial strawberry, but, at the same time, possessing the

and the Alacrity tomato, two varieties that have been sent out from Ottawa and very favourably commented upon by our experimenters.

Corn being a wind-pollinated crop the breeding of it cannot be success-



"ZUCKERBIRN" HARDY PEAR OF RUSSIAN ORIGIN, EMPLOYED IN THE PEAR-BREEDING WORK AT THE CENTRAL EXPERIMENTAL FARM

sweetness, texture and aroma of our wild species.

In outlining the work now being carried on in plant breeding in this Department, it might be well briefly to describe the different methods that have been employed in producing the Early Malcolm sweet corn

fully carried out by individuals located where a number of varieties or types of corn are grown, as cross pollination is liable to spoil much of the work attempted. Several seasons ago the Early Malakoff sweet corn was subjected to close selection and different types were

isolated Types similar to one another were inbred for a season and then employed for intercrossing with strains of similar character. This method was employed with the object of maintaining the vigour of the variety. At the time the type selection work on Early Malcolm was

early maturing sweet types. These recessives are now being tested and give promise of producing some valuable stock.

Tomato breeding was undertaken by combining the methods of individual plant performance with that of mass selection. These may briefly be described in the following manner:

Several hundred plants were individually recorded for yield, earliness of crop, quality of crop, size of fruit and vigour of plant growth. From these plants the ten best were selected for future work. The next season one hundred plants of each of these ten individuals were grown and the recorded performance of each plot made with regard to the same characteristics as those recorded for individual plants. At the same time ten small plots of some twenty plants in each were grown and crosses made between the most promising strains. Full data had thus been secured of the seed saved from these several selections. The following season some twelve hundred plants were grown for records of individual plant performance. An early fruiting type of good quality has been secured and the work now consists of growing a number of plots of the best strains of this selected strain, from which a quantity of seed is saved each year and is distributed to experimenters throughout the country.

The crop that perhaps lends itself most readily to plant improvement is that of the garden pea. As it is almost totally self-fertile (natural crosses rarely occurring) anyone interested in the growing of the garden pea can improve any variety, for which he may have a particular liking, by the simple method of plant selection. Briefly described the method employed here is that of growing several hundred plants of a variety, the seed being planted four to six inches apart. The crop is grown and allowed fully to mature. The plants are then sorted according to the number of pods on each. The



DWARF POT-GROWN APPLE TREE, WITH BLOSSOMS CROSSED AND ENCLOSED IN PAPER BAGS TO PREVENT MISCELLANEOUS AND UNDESIRABLE CROSSING

undertaken a number of crosses between Early Malcolm and early maturing types of flint and dent corns were also made. From these crosses several promising combinations were secured, the native Squaw corn producing a number of very

twenty best plants are shelled and the plants possessing the heaviest crop of dry shelled peas are chosen as the stock from which to raise the following crop. This method has been followed for a number of years with marked improvement of the original stock chosen. These selected types are being crossed with the object of combining the desirable characteristics of one variety with those of another and producing some new varieties that will fulfil the requirements of certain local markets better than is now done by the varie-

between these varieties and the progeny are now under test.

Tree fruits have received and are receiving a good deal of attention, but the results from this work take a number of years to show themselves, and as the work on plums and pears was only initiated some four years ago, results will not be obtained for some time to come. In apples a large number of very fine seedlings have been produced by the Dominion Horticulturist. These are now being tested in the orchards and several trees of distinct commercial value



HYBRID APPLE TREE IN BLOSSOM, THE PROGENY OF A CROSS BETWEEN *PYRUS BACCATA* x *P. MALUS*

ties generally grown. As an instance it might be cited that the Gradus pea is very extensively grown commercially, but as a variety cannot be considered a heavy-yielding type of pea. Its large pod and pea make it an attractive product, yet a pea with the yielding quality of the English Wonder or McLean Advancer, possessing at the same time the characteristics of the Gradus type, would be a very much more profitable pea to grow. With this object in view a number of crosses have been made

have been produced, as well as a number of others possessing a quality and appearance of fruit that make them well worthy of a place in any private fruit garden where dessert quality is the first requisite.

The work of improving the quality of our horticultural crops is very urgently needed. In this work the greatest assistance can come from that large army of amateur horticulturists throughout the country, the possessors of small gardens in which they are able to give the

closest personal attention to anything that may particularly attract them. It is from this class of horticulturists, more than from any other, that striking instances of plant improvement in fruits, flowers and vegetables have been produced from time to time both on this continent

and in Europe. The commercial or professional horticulturist cannot work towards an ideal, especially in the matter of the improvement of flowers, with as free a hand as can the amateur in his own garden with a crop of his own choice.

THE DAIRY AND COLD STORAGE BRANCH

LOSS OF FAT IN THE WHEY WHEN USING PEPSIN

BY GEO. H. BARR, CHIEF, DAIRY DIVISION

OWING to the scarcity of rennet extract in Canada in 1916, many of the cheesemakers were obliged to use pepsin as a substitute. It was generally admitted at the end of the season that there was a greater loss of fat in the whey when pepsin was used than there was when using rennet extract.

Considerable work was done at the Finch Dairy Station between February 23rd and May 10th, 1917, en-

deavouring to eliminate this extra loss of fat. Tests were made with different quantities of pepsin, setting the milk at different temperatures and developing a higher acidity in the milk before setting than is commonly practised. In preparing the pepsin solutions, one pound of pepsin was dissolved in one gallon of water.

The following results will be of interest to dairy officials throughout Canada:

TABLE I—SHOWING THE LOSS OF FAT IN THE WHEY FROM SETTING THE MILK AT 85 TO 86 DEGREES TEMPERATURE—CURDS IN THE WHEY OVER 2 HOURS AND 15 MINUTES

COAGULANT USED	Number Vats	Setting Temperature	Per Cent Fat in Whey
		Degree	
Armour's Pepsin.....	21	85.7	.225
Curdalac.....	12	85.5	.217
Cudahy's Granular Pepsin.....	3	85.3	.191
Cudahy's Liquid Pepsin..	1	85.0	.230
Renzyme.....	3	85.1	.196
Hansen's Rennet.....	7	85.5	.197
Videon's Rennet..	4	85.2	.170
Tousignant's Rennet....	1	86.0	.250
Average of vats set with pepsin.....	40	85.3	.218
Average of vats set with rennet.....	12	85.5	.209

TABLE II—SHOWING THE LOSS OF FAT IN THE WHEY FROM SETTING THE MILK AT OVER 86 DEGREES TEMPERATURE—CURDS IN THE WHEY OVER 2 HOURS AND 15 MINUTES

COAGULANT USED	Number Vats	Setting Temperature	Per Cent Fat in Whey
		Degree	
Armour's Pepsin	11	88.1	.251
Curdalac	2	90.5	.242
Cudahy's Granular Pepsin	2	87.5	.225
Cudahy's Liquid Pepsin	1	87.0	.280
Hansen's Rennet	1	87.0	.230
Videon's Rennet	2	89.5	.240
Hansen's R. P.	1	88.0	.300
Average of vats set with Pepsin	16	88.2	.249
Average of vats set with rennet	4	88.5	.252

TABLE III—SHOWING THE LOSS OF FAT IN THE WHEY FROM MILK DIVIDED INTO DIFFERENT VATS AND SET AT DIFFERENT TEMPERATURES

COAGULANT USED	Number Vats	Setting Temperature	Per Cent Fat in Whey
		Degree	
Armour's Pepsin	2	90.5	.215
Armour's Pepsin	2	85.0	.182
Curdalac	2	90.5	.242
Curdalac	2	85.0	.210
Average of vats set at high temperature	4	90.5	.228
Average of vats set at low temperature	4	85.0	.196

TABLE IV—SHOWING THE LOSS OF FAT IN THE WHEY FROM MILK SET AT 85 AND 86 DEGREES TEMPERATURE AND A HIGH ACIDITY

COAGULANT USED	Number Vats	Setting Temperature	Per Cent Fat in Whey
		Degree	
Armour's Pepsin	6	85.7	.276
Curdalac	2	85.5	.340
Cudahy's Granular Pepsin	3	85.7	.222
Hansen's R. P.	1	86.0	.215
Average of all vats	12	85.7	.268

TABLE V—SHOWING THE LOSS OF FAT IN THE WHEY FROM MILK SET AT OVER 86 DEGREES TEMPERATURE AND A HIGH ACIDITY

COAGULANT USED	Number Vats	Setting Temperature	Per Cent Fat in Whey
		Degree	
Armour's Pepsin	5	88.0	.302
Curdalac	1	87.0	.330
Average of all the vats	6	87.8	.306

TABLE VI—SHOWING THE LOSS OF FAT IN THE WHEY WHEN USING DIFFERENT QUANTITIES OF COAGULANT IN THE SAME MILK DIVIDED INTO DIFFERENT VATS

COAGULANT USED	Number Vats	Setting Temperature	Coagulant per 1,000 lb. Milk	Per Cent Fat in Whey
		Degree	Oz.	
Armour's Pepsin.....	1	85.0	5.5	.180
Armour's Pepsin.....	1	85.0	4.0	.205
Curdalac.....	3	85.0	6.0	.163
Curdalac.....	3	85.0	4.0	.183
Averages from large quantities of pepsin.	4	85.0	5.75	.171
Averages from ordinary quantities of pepsin.....	4	85.0	4.0	.194

SUMMARY OF ALL THE VATS FROM FEBRUARY 23RD TO MAY 10TH AT THE FINCH DAIRY STATION

COAGULANT USED	Number Vats	Time in Whey	Setting Temperature	Coagulant per 1,000 lb. Milk	Per Cent Fat in Whey
		Hr. Min.	Degree	Oz.	
Pepsin, ordinary temperature	40	2 57	85.3	4.55	.218
Pepsin, high temperature....	16	2 47	88.2	4.29	.249
Rennet, ordinary temperature	12	2 50	85.5	4.80	.209
Rennet, high temperature	4	2 47	88.5	5.37	.252
Pepsin, high acidity.....					
Low temperature.	12	2 05	85.7	3.94	.268
Pepsin, high acidity.....					
High temperature.	6	1 55	87.8	4.50	.306
Vats set high temperature*.	4	2 29	90.5	4.31	.228
Vats set low temperature*.	4	2 29	85.0	4.25	.196
Extra pepsin*.....	4	3 08	85.0	5.75	.171
Normal pepsin*.....	4	3 08	85.0	4.00	.194

*Same milk divided into different vats.

CONCLUSIONS

Summing up all the tests made between February 23rd and May 10th, we would say that in using pepsin, the best results were secured by setting at a temperature of 85 degrees and using enough pepsin to coagulate the milk ready to cut in from 25 to 30 minutes. Setting the milk at temperatures over 86 degrees increased the loss of fat in the whey in nearly every case.

The loss of fat in the whey was lessened by increasing the quantity of pepsin per 1,000 pounds of milk from 4 ounces to 5.5 and 6 ounces.

Developing the acidity in the milk so that the curds dipped in less than 2 hours and 15 minutes from time

of setting, increased the loss of fat in the whey to a marked extent.

It was found advisable to allow the curd to get fairly firm before cutting, but there was no advantage in letting it get overly firm.

In some cases the whey from milk set with pepsin tested lower in fat than the whey from milk set with rennet extract. It seems, however, that varying conditions in the milk from day to day as found in everyday factory work affect the loss of fat in the whey to a greater extent when pepsin is used than when rennet extract is used. Therefore, the greatest care must be exercised in cutting the curd and stirring it while cooking when making cheese with pepsin.

THE ENTOMOLOGICAL BRANCH

THE RELATION OF SOIL INSECTS TO CLIMATIC CONDITIONS

BY ALFRED E. CAMERON, M.A., D.Sc., ENTOMOLOGICAL BRANCH

INTRODUCTION

WE may take it as a general rule that the conditions in the soil which are most favourable to plant life are also those which are most beneficial to the vital processes of all animal organisms which have made it their habitat, whether spending their whole life in or on the soil or leading a subterranean existence only during one or more of their metamorphic periods, as is the case with many insects.

In a consideration of the interrelationships which exist between soil insects and the physical factors of their habitat, the vegetational aspect must not be minimized. Phytophagous species predominate over those that are predacious, and where other conditions are favourable, the food plant is a very significant, determinative agent in the constitution of the insect fauna of any region, whether subterranean or aerial. Practically speaking, the fundamental principles underlying the science of economic entomology, have been established by attention being paid to this very fact. According as climatic conditions allow, entomologists may rather accurately prophesy what genera and sometimes species of insects are likely to exact toll on the cultivated crops of any one district. Climatic factors play an important part in determining the distribution of species.

The insect pests of any particular crop together with their parasites and predators, constitute a well-defined community wherein several environmental factors influence their welfare. The oscillation of any one

of these factors may tend to exert a beneficial or injurious effect upon the component insect species, and the greater the swing of the pendulum the greater the resulting benefit or injury. At present, it is not possible with the data at hand to relegate to any one climatic factor, except in a very general way, its influence as a destructive or constructive associational agent, but it is a very well-known fact that the variations of the intensities of insect activities can be correlated with environmental changes as much as any other natural phenomenon.

A series of favourable occurrences will, for instance, cause the rapid increase of an insect species which may, so far as the agriculturist is concerned, have been a negligible quantity in his estimation of the operations which demand his attention. It should, therefore, be the aim of the economic entomologist to decide the causes of what is designated a "serious outbreak", and, if these causes can be eliminated or controlled, to recommend the prophylactic method which is most consonant with economy. A case *à propos* of the relationship of the environment to the insect may be cited, occurring in the province of British Columbia in the past year. Until recently, the pear thrips, *Taeniothrips pyri* Dan, had not been recorded from regions further north than the Sacramento Valley of California on the Pacific Coast. Apparently, it made its appearance in the orchards of Vancouver Island as a serious pest. From information elicited from the orchardists concerned, it was learned that the actual

introduction of the species must have taken place several years ago; but only within the last two years has its numbers assumed such proportions as to attract attention. The reason perhaps is that during the first years of its introduction into the province, it encountered one or more natural checks. With the probable removal of these, or loss of their effectiveness through the species adapting itself to its surroundings, it multiplied so quickly as to assume an alarming aspect. It is quite a feasible argument to suppose that the lower soil temperatures which prevail in the more northerly latitudes, served at first as a competent restraint on its natural tendency to increase. Hence its presence was in all likelihood overlooked. Or, it may be that this species which spends eight to nine months in the soil in the larval and pupal stages, was controlled by the excessive droughts which often prevail in the summer in that part of Vancouver Island to which it is at present confined. Gradually, however, a species may adapt itself and become inured to changed conditions, although at first reacting negatively towards them. If, as may be argued, the species is indigenous to the province—and its discontinuous distribution would appear to controvert this fact—the interpretation of the abnormal recent increase of its numbers would still be in accord with our theories of climatic influence.

It will be readily foreseen from the foregoing that it devolves upon the entomological ecologist to make accurate measurements of the climatic factors, if the study is to pass beyond the merely descriptive stage and be enumerated among the more exact sciences.

The factors which exert a profound influence upon soil insects, are more or less well known. Most important are, temperature, humidity, soil texture and structure, soil

ventilation including soil gases, and barometric pressure. The best index of these factors is the evaporating power of air, which depends more or less closely upon air currents and temperature. It is measured by means of the porous cup atmometer. The intensity of light is another factor which cannot be neglected.

RESPONSE TO LIGHT

Very few soil insects are other than negatively phototropic. In illustration, of this fact, it is only necessary to make mention of the retiring habits of species of various families which include insect denizens of the soil. Among these are numbered the various species of Forficulidae, larvae of Noctuidae and Hepialidae, larvae and adults of Carabidae, Staphylinidae and Silphidae, larvae of Scarabaeidae, Elateridae, Telephoridae, Lampyridae and Rhynchophora, soil-inhabiting larvae of various dipterous families, examples of which are represented variously among Cecidomyiidae, Mycetophilidae, Bibionidae, Tipulidae, Stratiomyiidae, Leptidae, Ther-evidae, Dolichopodidae, Asilidae, Tabanidae, Muscidae, Anthomyiidae and Sapromyzidae. The great majority of the apterygote Thysanura and Collembola avoid direct sunlight, but the species *ambulans* L. and *finetarius* L. of the genus *Onychiurus* (Lipura) are positively phototropic, or, at least, do not always react negatively to sunlight.

It may be that as the intensity of light varies, the animals respond in a definite manner. How far this factor operates, has not been investigated to any great extent. In the case of predacious insects inhabiting the soil the response to the stimulus of light may be overruled when the animal is hot on the scent of its prey. For instance, many species of Carabidae and Staphylinidae, which may be regarded as typical soil Coleoptera, frequenting

the recesses of the soil at all times, often hunt their prey *en plein soleil*.

RESPONSE TO ATMOSPHERIC PRESSURE

In mountainous regions, as one ascends, the barometric pressure gradually diminishes. It is probable that, correlated with this fact, is the association of certain species with lower or higher altitudes. A few species have been captured on the summit of Mt. Cheam of the Coast Range, British Columbia, 8500 feet high, notably *Pangonia fera* Will. and *Tabanus comastes* Will., the latter taken in copulation once by my colleague Mr. R. C. Treherne, indicating that the species was not far distant from its true habitat or breeding ground. *T. comastes* according to Dr. S. Hadwen, of Agassiz, B.C., is also quite common on lower altitudes, and, similarly *T. sequax* Will., taken by him at altitudes ranging from 4000-5000 feet, to as low as 2000 feet. Similarly, numerous examples of Lepidoptera seem to frequent mountainous regions. *Erebia vidleri* El. occurs commonly on the summit of Mt. Cheam and also *Oeneis norna* var *beanii* El. The varied experiences of entomological collectors could greatly multiply the examples of forms frequenting the upper reaches of high mountains.

The indications are strong that there is some affinity between the presence of these forms and atmospheric pressure, and future investigation, it is hoped will show the extent of this relationship. Soil-inhabiting insects are just as likely to respond to this factor as aerial forms, since there is unbroken continuity between soil and atmospheric air.

CONSIDERATION OF THE EVAPORATING POWER OF AIR

In regard to evaporation and its effects upon animals, Shelford in his "Animal Communities in Temperate America" (Chicago, 1913) gives a

fairly representative summary of our present knowledge of this phenomenon. In his definition, quoting Hann, ("Handbook of Climatology", New York, 1913, p. 72), he states that the total effect of air temperature, pressure, relative humidity and average wind velocity upon a free water surface in the shade or in the sun is expressed by the amount of water evaporated. We have no hesitation in supporting his assumption that, as a physical index of the varied conditions which control an organism, the evaporating power of air is supreme to any other. As this author indicates (p. 162), however, different climatic conditions will cause variations of the individual factors, and, for this reason, records of light, temperature and pressure, amount of carbon dioxide, etc., should be made. As an instance of the response to variation of evaporating power Shelford—*loc. cit.*, p. 163) proceeds to state that a high rate of evaporation is not equally advantageous or injurious to all animals, and instances the case of such amphibians, insects and millipedes, which frequent dense woods and react negatively to an atmosphere of high evaporating power. Inversely, those animals which inhabit dry, sandy areas, thrive best in air of high evaporating power. Necessarily, as the author remarks, the power of resistance of an animal exposed to an atmosphere of high evaporating power, to which it responds negatively, will vary as the thickness of its integument or protective covering.

RESPONSE TO TEMPERATURE

That there is an undoubted relationship between the various life-processes of insects and the temperature of their habitats, is now supported by a large body of opinion. Workers who have been active in this field, are numerous and include such well known experimentalists as Headlee, Sanderson, and Dean in

America and Bachmetjew in Europe, the last of whom has produced a monumental record in his "Experimentelle Entomologische Studien".

For every species of insect there is probably an optimum temperature of development at which the physico-chemical reactions resulting in growth and metamorphoses, proceed most favorably. A great deal of practical work has been accomplished in this field, and some attempt has been made to correlate temperature not only with insect development but with the phenomena associated with hibernation, aestivation, reproduction and mortality. Sanderson in his paper on "The Relation of Temperature to the Growth of Insects" (*Jour. Econ. Ent.*, vol. iii, p. 114), discusses the much debated "thermal constant" or uniform accumulation of temperature for the various stages of insect growth. This author is probably correct in saying that the relation of temperature to growth phenomena is perhaps different for each species and might be expressed by a curve, the abscissae of which represent degrees of temperature and the ordinates the time factor. He further asseverates that although a fairly constant "total effective temperature" for any given phase of an insect's life or activity may be secured for the summer months, when there is a fairly constant mean temperature, such an accumulation will have no meaning in regard to the same phenomena in spring or autumn when the temperatures are more variable. This will be readily understood when one considers the increased time and, therefore, increased accumulation required by the second and succeeding generations of many insects with two or more generations per year. For example, most insects which hibernate as larvae or pupae require a much longer period, as a rule, to complete their transformations in the preimaginal stages than the same species would require for the same phases in summer. Many Anthom-

yiidae, e.g. *Pegomyia hyoscyami* Panz, which under normal conditions in England will pass through the pupal period in about 17 days, have been known by the author to hibernate as puparia in the soil for as long as 114 days, (see "A Contribution to a Knowledge of the Belladonna Leaf-Miner, *Pegomyia hyoscyami* Panz, *Ann. App. Biol.*, vol. I, 1914, p. 61). Several parallel cases could be cited.

There is no physiological fact more important than the temperature relations existing between fauna and habitats. Among soil insects the admissible range of variation of temperature may be quite considerable without exerting any injurious effect upon the various species. As a general rule, high temperatures have a decidedly stimulating effect which is reflected in the more intense activities of insects in summer. During winter the low temperatures, on the other hand, induce torpor and passivity. At this season soil insects seek their hibernating quarters, and surface frequenters may entrench themselves deeply to escape the cold.

Much of the seasonal variation in the appearance of various insect species may be attributed to abnormal changes of temperature from season to season. Fuller investigation along this line would be productive of very interesting results. The physiological processes of insect life which result in metamorphoses are, as we have already noticed, essentially dependent on temperature. The katabolism and anabolism involved in histolytic changes depend upon the antecedent creation of a certain molecular swing which is only imparted by the stimulus of the effective temperature. That these facts have a practical significance in regard to the seasonal appearance and reappearance of injurious insects cannot be doubted. Three years ago the author in a paper entitled "General Survey of the Insect Fauna of the Soil" (*Jour.*

Econ. Biol., vol. iii, pat. 3), stated (p. 195) that "varying weather conditions have an important bearing on various insect pests which vary in their prevalence from year to year." Of course, we do not forget that the intervention of insect parasites has an important function in preserving the balance of nature. In the passage just quoted the hope was also expressed that "definite meteorological observations carried out in association with entomological investigations, would solve many of the problems relative to this phenomenon". In the interim, the author has encountered no argument sufficiently powerful to alter this opinion.

It is important to bear in mind in tabulating the records of soil temperatures, that the kind of soil should always be indicated. It is well known that peaty and other dark soils absorb heat, while pale clayey, chalky and other soils reflect it. Schübler, quoted by Woodward ("Geology of Soils and Substrata", London, 1912, p. 92), estimated the power of soils in retaining heat as follows: calcareous sand, 100; siliceous sand, 95; sandy clay, 76; loamy clay, 71; stiff clay, 68; grey clay, 66; humus, 49. This same author goes on to state (*loc. cit.*, p. 93) that "the scorching effect of the sun on grass in areas on gravel as compared with similar areas on clay is very noticeable. During the prolonged drought of 1911 in Great Britain, the inability of the sun to penetrate the clay was proved by an experiment on August 9, which was the hottest day with a shade temperature of 96° F. It was then found that 6 inches below the surface the temperature of the earth was no more than 76° F."

Such facts as these will have to receive close attention in the interpretation of soil-temperature records. It is essential that in a study of the insects of any particular type of soil, the investigator should make his own records and not base his conclusions upon those made in another

locality with, perhaps, a quite different type of soil, exhibiting a different range of temperature. For comparative study the utility of these records will not be denied, and in time, with a sufficiently large body of enthusiastic workers, we may be sanguine enough to hope that adequate records of all the more important climatic factors will be acquired in different regions of the continent.

Many of the facts which have been definitely established by the soil physicist, have proved most useful to the ecological botanist and zoologist. The student of soil insects must remember that the temperature of the soil and subsoil is by no means uniform but varies irregularly with depth. Hence, records of temperature 3 inches below the surface would bear but little relation to the behaviour* of those species which burrow more deeply. The great majority of soil insects, however, pursue their activities at a depth not exceeding 6 inches, and throughout these 6 inches the variation of temperature is very small, depending on whether the soil is cultivated or overgrown with vegetation. Due allowance must always be made for the species which penetrate further down either normally or only for special purposes, such as hibernating.

INFLUENCE OF SOIL MOISTURE

To what extent soil water determines the physiological processes of terrestrial animals has not been fully ascertained. Certain it is that of the three forms of soil moisture, namely gravitational, capillary, and hygroscopic, the first is probably most destructive of insect life, while the second is perhaps the most important in maintaining the proper humid conditions for the prosperity of the soil fauna. The third form, on account of its infinitesimal amount, is practically negligible in its effects upon the vitality of soil insects. Mortality among them is greatest in winter and spring, when the ac-

cumulation of gravitational water is at its maximum. Again, these are the seasons when most soil insects have assumed the susceptible larval and pupal stages. Even where larval and pupal forms can withstand protracted periods of submersion without being seriously inconvenienced, very few were found that can survive the continued absence of air expelled from the flooded, soil pore-spaces. It has been frequently observed by the author that clay soils are less productive of insect species than any other. The reason for this is perhaps dual. In the first place the tenacious, unyielding nature of the clay renders it more or less impervious to burrowing forms, unless it be sunbaked and cracked. At least, their activities are seriously interfered with. Secondly, the percolation of gravitational water through clay is very slow owing to the smaller pore-spaces. In other words, a clay soil is very retentive of moisture and drains exceedingly slowly.

At the other extreme, the complete lack of moisture in a soil owing to prolonged drought, would prove fatal to many soil insect species. At any rate, it has the effect of driving the more active forms to greater depths, which return again to the surface when capillary attraction is re-established in the soil by a renewed rainfall. This is often exemplified in the marked appearance and disappearance of soil-inhabiting *Collembole*. Larvae of *Carabidae* and *Elateridae* will penetrate quite deeply in order to secure the necessary moisture conditions.

Fossorial wasps always choose a light sandy soil for their operations. They burrow down to a depth where the sand is likely to retain sufficient moisture to lend stability to their underground galleries and larval chambers. Their choice would seem to be determined by the light texture and consequent easy excavation of the soil. But consideration of the moisture factor also enters into the

question; otherwise, the soft bodied larvae would run grave risks of dessication. In this connection, temperature undoubtedly plays an important role when it is remembered that, in summer, a sandy soil registers at the surface a few more degrees of temperature than any other. Sand, however, differs from clay in that the warmth does not penetrate so readily.

RESPONSE TO SOIL GASES

The ventilation of soils is a factor which has been almost neglected in soil insect investigations. The aeration of a soil depends more or less on its texture and capacity for heat. Loose, open soils are subject to peculiarly thorough breathing, while all close-textured soils, such as the heavy and stiff clays, are very deficiently ventilated. High temperatures, by stimulating the more rapid diffusion of gases, aid in a more perfect soil aeration. In the soil, the presence of oxygen is essential for all forms of life, no less than for those species which frequent more open habitats. Soils which are rich in humus, usually contain an excess of carbon dioxide, consequent on the disintegration of complex, organic compounds, with liberation of this gas. It would be interesting to measure the effect of this and other soil gases on the constitution of the soil fauna. At least soil gases must be allowed due consideration in any study relating to soil insects.

CONCLUSION

So far as the author interprets the chain of evidence which links up the environmental factors to the composition of the soil insect fauna, the facts may be briefly stated as follows. The flora of a district depends on the type of soil, its structure texture and composition, temperature and rainfall. Soil insects of phytophagous habits frequent those soils where their food plants thrive, provided other external con-

ditions are also suitable. These phytophagous species again, account for the presence of their insect predators. A change in any one of the factors constituting a habitat, will have an important influence in changing the facies of the fauna, tending to give rise to suc-

cessional phenomena. On the other hand, a species may be more or less able to adjust itself to environmental changes, provided they are not too abrupt nor drastic. In this respect some species are more plastic than others.

THE LIVE STOCK BRANCH

THE RECORD OF PERFORMANCE

BY C. S. WOOD, CHIEF INSPECTOR, RECORD OF PERFORMANCE

DURING the past year feed conditions were so bad that the owners of dairy cattle, in a great number of instances did not know how they were going to feed their cows during the winter. Under these circumstances it is not

to be wondered at that there should have been a slight falling off in the number of cows entered for the Record of Performance test.

The following is a brief summary of the year's work:



AYRSHIRE COW "JEANNETON" 13358
Produced at 15 years of age, 14,150 lb. milk; 575 lb. fat

NUMBER OF COWS ENTERED FOR R. O. P. TEST

Ayrshire.....	656	Decrease as compared with last preceding year	21
French-Canadian.....	44	Increase " " " " " "	1
Guernsey.....	27	" " " " " "	8
Holstein.....	628	Decrease " " " " " "	86
Jersey.....	192	" " " " " "	6
Shorthorn.....	137	Increase " " " " " "	16
Total.....	1,684		

NUMBER OF COWS QUALIFIED

Ayrshire.....	223.	Increase as compared with last preceding year	48
French-Canadian.....	14.	" " " " " "	6
Guernsey.....	8.	" " " " " "	1
Holstein.....	221.	Decrease " " " " " "	12
Jersey.....	64.	Increase " " " " " "	7
Shorthorn.....	50.	" " " " " "	16



HOLSTEIN-FRIESIAN COW "PLUS PONTIAC ARTIS" 16792

Following are the names, records and owners of highest butter-fat producing cows in each of the breeds and classes:

AYRSHIRE

Mature:

"Lady Jane" 30886, 19,405 lb. milk; 786 lb. fat. Owned by A. S. Turner & Son, Ryckman's Corners, Ont.

Four-year-old:

"Milkmaid of Orkney" 39834, 14,872 lb. milk; 596 lb. fat. Owned by Harmon McPherson, Orkney, Ont.

Three-year-old:

"Scotch Thistle" 41685, 14,907 lb. milk; 631 lb. fat. Owned by A. S. Turner & Son, Ryckman's Corners, Ont.

Two-year-old:

"Springbank White Rose," 44100, 12,209 lb. milk; 546 lb. fat. Owned by A. S. Turner & Son, Ryckman's Corners, Ont.

FRENCH-CANADIAN

Mature:

"Florida" 1353, 9,872 lb. milk; 514 lb. fat. Owned by D'Arcy Scott, Ottawa, Ont.

Four-year-old:

"Pauline 3rd" 2482, 10,210 lb. milk; 484 lb. fat. Owned by Paul Sylvestre, St. Simon Bagot, Que.

Three-year-old:

"Labelle 2nd" 2865, 7,916 lb. milk; 406 lb. fat. Owned by Director, Experimental Farms, Ottawa.

Two-year-old:

"Bruna Reine" 3228, 7,484 lb. milk; 337 lb. fat. Owned by Paul Sylvestre, St. Simon Bagot, Que.

GUERNSEY

Mature:

"Trislette of Whitewater" 392, 15,502 lb. milk; 631 lb. fat. Owned by Chas. Hawthorne, Chilliwack, B.C.

Four-year-old:

"Western Queen" 834, 12,132 lb. milk; 661 lb. fat. Owned by Banford Bros., Chilliwack, B.C.

Three-year-old:

"Western Queen" 834, 10,153 lb. milk;

Two-year-old:

"Morningside Bessie Echo" 27589, 16,031 lb. milk; 590 lb. fat. Owned by Wm. J. Aikins, Bellevue, Ont.

JERSEY

Mature:

"Sunbeam of Edgeley" 629, 18,744 lb. milk; 926 lb. fat. Owned by James Bagg & Sons, Edgeley, Ont.

Four-year-old:

"Beauty Maid" 2019, 14,852 lb. milk; 872 lb. fat. Owned by D. A. Boyle, Woodstock, Ont.

Three-year-old:

"Flora of Glenboyle" 3843, 11,954 lb. milk; 634 lb. fat. Owned by D. A. Boyle, Woodstock, Ont.

Two-year-old:

"Lady Pauline" 4266, 10,023 lb. milk; 491 lb. fat. Owned by Wesley McIntyre, Sardis, B.C.



JERSEY COW "BEAUTY MAID" 2019

576 lb. fat. Owned by Banford Bros., Chilliwack, B.C.

Two-year-old:

"Gladys of Willow" 654, 10,234 lb. milk; 544 lb. fat. Owned by W. M. Banford, Chilliwack, B.C.

HOLSTEIN-FRIESIAN

Mature:

"Toitilla of Riverside" 12256, 24,094 lb. milk; 846 lb. fat. Owned by Joseph O'Reilly, Peterboro, Ont.

Four-year-old:

"Hill-Crest Pontiac Vale" 18781, 22,785 lb. milk; 789 lb. fat. Owned by G. A. Brethen, Norwood, Ont.

Three-year-old:

"Plus Pontiac Artis" 16792, 21,018 lb. milk; 792 lb. fat. Owned by S. Lemon, Lynden, Ont.

SHORTHORN

Mature:

"Coquette 2nd" 107052, 17,723 lb. milk; 636 lb. fat. Owned by Edward Knight, Vanessa, Ont.

Four-year-old:

"Iford Waterloo Baroness" 104584, 10,410 lb. milk; 381 lb. fat. Owned by Ontario Agricultural College, Guelph, Ont.

"Norma of Northlynd" 101096, 9,080 lb. milk; 381 lb. fat. Owned by Geo. Jackson & Son, Downsview, Ont.

Three-year-old:

"Barbara" 96741, 11,208 lb. milk; 437 lb. fat. Owned by W. B. Affleck, Middleville, Ont.

Two-year-old:

"Jean Lassie 10483, 8,939 lb. milk; 371 lb. fat. Owned by S. A. Moore, Caledonia, Ont.

THE SEED BRANCH

SCREENINGS IN MILL FEEDS

J. R. DYMOND, SEED ANALYST

AT the annual meeting of the Ontario Swine Breeders' Association held in Toronto, February 6th, 1917, the following resolution was adopted:

"That whereas in purchasing mill feeds farmers have found the material offered for sale is heavily adulterated with injurious weed seeds, mill sweepings, etc., and in many cases the use of such has resulted in serious injury to, and loss of, valuable animals, we strongly urge the Government to investigate the situation and take immediate action to prevent the sale of such adulterated feed."

It is the practice of practically all flour mills in this country and in the United States to mix with the bran and shorts the screenings taken from the wheat. Formerly the material was unground but at the present time regulations in both countries require the complete pulverization of all weed seeds included in the feeds.

In Ontario the flour is made from (a) Ontario wheat, or, (b) Western wheat, or (c) a mixture. Feeders prefer the bran and shorts from the mills grinding Ontario fall wheat because it appears to be not only better in itself but is comparatively free from screenings. This in turn is due to the fact that the Ontario fall wheat is much freer from impurities than the western grain.

Western wheat is handled on the basis of its grade. On arrival at the terminal elevators at Fort William and Port Arthur it is cleaned to remove the smaller impurities and binned along with other grain of the same grade. This means that when an Eastern miller buys, say, No. 2 Northern wheat, the grain he receives is a composite of several lots,

probably from different parts of the West. It thus follows that large shipments of wheat of the same grade are practically identical in weed seed content.

Before wheat is ground for flour all dirt and impurities are removed from it. The screenings consist chiefly of broken and shrunken wheat, wild buckwheat, cultivated and wild oats, and smaller quantities of the larger weed seeds, such as ball mustard and great ragweed and a trace of the small weed seeds which have not been entirely removed in former cleanings. The latter include lamb's quarters, wild mustard, hare's-ear mustard, stinkweed and various others of the western weeds.

It is these smaller weed seeds which are disagreeable in taste and which sometimes render the feed in which they occur unpalatable to stock, particularly hogs. However, the average run of screenings from Western wheat does not contain enough of these small seeds to affect the palatability of the feed with which it is mixed. It is only when they become concentrated in comparatively large numbers which might happen from a variety of causes that the trouble complained of in the above resolution could occur. The great bulk of screenings are the best of feed and if the smaller seeds could be entirely eliminated probably no objection to the inclusion of screenings in mill feeds would occur.

Millers are advised to regulate their cleaning machinery so that whatever small black seeds are contained in the wheat may be delivered separately and destroyed. Mills

operated by steam can use these black seeds as fuel, as they burn readily on account of the high oil content of the mustards.

Shorts is a favourite feed for young pigs and any impurities that interfere with its value as feed are liable to cause serious injury to the health of the young animals. The present practice of mixing screenings with the mill feeds, which, in most cases cannot be objected to on the grounds of lowering the feeding value, makes it impossible ever to be certain when purchasing a lot of this feed that it does not contain deleterious impurities. Under present conditions it would be difficult for mills to dispose of their screenings were they prohibited from mixing them with their feeds. Most farmers and feeders have a great dread of screenings and would not buy this material if they knew what it was. In this they are mistaken. Screenings taken by eastern flour mills out of Western wheat is made up largely of broken and shrunken wheat and wild buckwheat. Only small quantities of other weed seeds including bitter mustard seeds and other objectionable impurities are found in this class of screenings. This material makes excellent feed for some classes of stock, and once feeders learn its proper uses it is probable that it will command a higher price

than it now does when mixed with the feed. It should be especially valuable for sheep and poultry. Pigs will do well on it unless it contains mustards or other objectionable seeds. It makes a satisfactory cattle feed too. To prevent any possibility of spreading weeds, screenings should be ground or chopped before being fed. This may not be necessary when fed to poultry.

Always clean screenings so as to remove all seeds as large as lamb's quarters before trying to use them as feed. This is necessary, (1) to remove bitter seeds, (2) to prevent the spread of weeds (these small seeds are not pulverized by ordinary choppers). A number of feeders interested in this question could co-operate with a local miller in using grain screenings as suggested above, and demonstrate to themselves and the miller that it is feasible to keep the feed pure and dispose of the screenings separately as a feed for sheep, poultry, cattle or pigs.

Until a demand is created for the siftings removed from wheat in flour mills, and until their proper use is understood by feeders it is useless to press for their exclusion from the mill feeds, as this would only necessitate the throwing away of an enormous amount of good feed or its use as an adulterant of some other class of grain products.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE
WHO HAVE ENLISTED FOR OVERSEAS SERVICE

A. Finnamore, Fredericton, N.B.
E. N. Castonguay, Ottawa.

CASUALTIES
R. H. L. Uglow, Ottawa (died of wounds).

PART II

Provincial Departments of Agriculture

DISTRIBUTION OF EGGS TO THE SCHOOL PUPILS

The poultry stock of several of the provinces has undoubtedly been greatly improved through the distribution of eggs for hatching. In order that the methods and experiences of the different provinces that have adopted this system may be available to each other, and more especially to those that have not undertaken this method of poultry improvement, the following articles have been brought together.

QUEBEC

BY BR. M. LIGOURI, OF THE PROVINCIAL POULTRY BRANCH

SOME twenty-five thousand eggs were distributed this year by the Poultry Branch of the Quebec Department of Agriculture to the pupils of elementary schools and others. Practically the eggs only of American breeds were included in this distribution: Rhode Island Reds, Plymouth Rock and Wyandotte. Most of the eggs were supplied by the poultry stations of the Department, by the co-operative associations, and Macdonald College.

The distribution was made through the District Representatives and under their direct supervision, with the help of women's institutes and some agricultural co-operative associations.

Each pupil receiving twelve eggs for hatching purposes must sign a contract by which he agrees to follow the instructions given concerning the care of the eggs, the hatching,

raising, etc., and to report the results of his work to the Department on special forms supplied by the latter.

In the fall, all these young poultrymen are invited to take part in a local school fair and to show the chickens hatched from the eggs of the school distribution. This is the reason why the Department has made it a rule that no distribution can be made except in the districts where the school commissions have agreed to help in the organization of school gardens and of local or district fairs, where the produce of these gardens and of small poultry yards, cared for by pupils of rural or village schools, are shown.

The judging at these school fairs is generally done by officers of the poultry and horticultural branches and prizes are given for the best exhibits.

MACDONALD COLLEGE

BY M. A. JULL, B.S.A., MANAGER, POULTRY DEPARTMENT

1. THE GENERAL POLICY OF DISTRIBUTION FOLLOWED THIS YEAR

FROM the time of the establishment of the Poultry Department at Macdonald College eggs have been distributed annually. This year, as in the preceding four years, eggs for hatching have been distributed under two plans:

First.—There has been the general distribution of hatching eggs to farmers and poultry breeders in different parts of the country. This is a commercial phase of the work carried on at the college. It involves the selling of eggs from well-bred strains to parties who purchase the same at normal price, and by this means eggs have been distributed over all parts of Quebec, many have been sent to various parts of the Maritime Provinces, a few have been sent to different parts of Ontario, particularly Eastern Ontario, a few have been sent to Western provinces, and a few have been shipped to various places in the United States. Chief attention, however, is given to the distribution of hatching eggs in the province of Quebec, and while it is a policy of the college to satisfy the needs of customers as far as possible, certain restrictions have been introduced to enable us to make as wide a distribution as possible. In previous years each customer was supplied with whatever quantity of eggs he desired. It was found, however, that through large orders being placed by certain individuals, it became practically impossible to supply the far larger number of customers who requested from one to four sittings each. Therefore, this year the policy was adopted of restricting the number of the eggs sent to each customer to four sittings. The introduction of this rule has allowed us to supply a far larger number of customers than in pre-

vious years.

The second plan of distributing hatching eggs is a continuation of a practice evolved in the spring of 1913. In that year the plan was adopted of distributing gratis hatching eggs to deserving rural school pupils, the first distribution being made at Cookshire, Lennoxville and Shawville. This year under the same plan eggs have been distributed to 329 schools, allowing only two sittings per school, the distribution being made at Shawville, Breckenridge, Lachute, Huntingdon, Cowansville, Clarenceville, Foster, Knowlton, Richmond, Lennoxville, Cookshire and Scotstown. In addition, eggs have been sent to various French-speaking districts of the province through the Provincial Department of Agriculture. As far as the applicants in the 329 schools of the English-speaking parts of the province are concerned, each applicant who received a sitting of eggs agreed to give the chickens hatched the best of attention and to show all those chickens, but no others, at a school fair to be held in the fall and where prizes will be provided.

2. THE SOURCES OF EGG SUPPLIES

The source of all eggs sold on a commercial basis to farmers and poultry breeders is the poultry plant of Macdonald College.

The sources of egg supplies for the distribution to school children include the poultry plant of the College and the flocks of a number of poultry house demonstrators, where the flocks have been kept under certain rules and regulations adopted by the Poultry Department of the college and where the breeding work is carried on under the supervision of the poultry department, the male birds being purchased each year from the college.

3. THE NUMBER OF EGGS DISTRIBUTED BY BREEDS

The following table gives the number of eggs distributed by breeds, each year for 1915, 1916 and 1917:—

BREED	1915	1916	1917	Total
Barred Plymouth Rocks.....	12,770	8,758	12,432	33,960
White Wyandottes.....	460	205	135	800
Rhode Island Reds (single comb).....	135	390	120	645
White Leghorns (single comb).....	540	695	1,060	2,295
Total.....	13,905	10,048	13,747	37,700

Although some nine different breeds are maintained on the college poultry plant it has not been the practice to offer hatching eggs from certain breeds, the numbers of which have been necessarily limited. Therefore, eggs for hatching have been offered from breeding pens only of Barred Plymouth Rocks, White Wyandottes, Single Comb Rhode Island Reds and Single Comb White Leghorns. Furthermore, it might be said that although we receive more inquiries for Barred Plymouth Rock hatching eggs than all other breeds put together, there are two reasons why the number of eggs of this breed are so large in contrast with other breeds. In the first place, because of the large demand Barred Plymouth Rocks are kept in larger numbers than any other breed and thus we are able to offer more

hatching eggs than from the smaller pens of the other breeds. In the second place, the policy has been adopted of distributing eggs of one breed only to the school children, and the breed used up to the present time has been the Barred Plymouth Rocks.

The following numbers of eggs have been distributed to school children in the years 1915, 1916 and 1917 respectively, 7,930, 6,933 and 9,312.

4.—Relative to the inquiry regarding the distribution of day-old chicks we wish to say that Macdonald College has not followed the practice of selling day-old chicks, the chief reason being the impossibility of supplying the heavy demands over and above the large orders for eggs for hatching.

ONTARIO

BY R. S. DUNCAN, B.S.A., DISTRICT REPRESENTATIVE SUPERVISOR

DURING the past few years eggs of a bred-to-lay strain of utility breeds of poultry—Barred Plymouth Rock, Rhode Island Red and White Wyandotte—have been distributed pretty much over the province through the medium of the District Representatives in the rural school fair movement.

The general policy of distribution has been confined almost entirely to pupils attending the

rural schools. In districts where a rural school fair has been organized three settings of eggs were allowed each single-roomed school. A two-roomed school was treated as two separate units for school fair purposes.

A nominal charge of 25c. per setting was made, the money thus collected being placed to the credit of the rural school fair association to be used as prize money. All other pupils had the

privilege of taking a package of seeds of some crop for a home garden plot. In addition to their crop these pupils had the opportunity of taking a setting of eggs at the cost price of 60c. Thus in a school fair district composed of ten schools there would be 30 dozen settings distributed at 25c. per setting and perhaps from 1 to 3 additional settings per school at the cost price of 60c. each. Let us say for illustration that 40 dozen were distributed to the pupils in this district. If 60 per cent of these eggs hatched and the chickens attained maturity there would be 288 chickens alive at school fair time in September. We are quite safe in saying for every pullet hatched there is also a cockerel reared, which would result in an average of 144 pullets in the one school fair district of ten schools. Assuming that the above method of calculation is fair we would have approximately 33,448 pullets of the special bred-to-lay strain from the 9,283 dozen eggs distributed to the pupils of the rural schools in Ontario, each doing her bit to assist in the campaign of "Greater Egg Production for 1918". These bred-to-lay chickens have a great influence in the improvement of the poultry industry in the province. In addition a great interest is aroused amongst the pupils, and

parents also, in poultry raising on the farms.

These eggs for hatching have in the past been obtained very largely through the Poultry Department of the Ontario Agricultural College, Guelph. During the past two or three years, however, the District Representatives have established poultry breeding stations in their respective counties and practically all the eggs distributed in 1917 were from this source. The District Representative usually arranges for a breeding station sometime in the fall by selecting some young farmer who is particularly interested in poultry and who will give special care to the poultry flock. The pullets are specially selected by the District Representative, who arranges to procure cockerels from a bred-to-lay strain from the O.A.C., Guelph, with which to mate up the hens. The breeding station consists of from 25-100 pullets and hens mated with from 2-7 cockerels.

Besides distributing eggs to school pupils the breeding stations are usually taxed to their utmost capacity to supply eggs for hatching to the farmers in the district.

The number of eggs distributed by breeds during the past three years may be summarized as follows:

	1915	1916	1917
Barred Plymouth Rocks.....	not	7,357	8,940
Rhode Island Reds.	classified	406	293
White Wyandottes.....	according	295	50
	to breeds		
Totals.....	6,868 doz.	8,058 doz	9,283 doz.

BY J. B. DANDENO, INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

BY an arrangement with the Poultry Department of the O.A.C., Guelph, eggs for hatching were supplied in limited quantities for May delivery at 50

cents a dozen in 100-egg lots to pupils of schools in which classes in agriculture are maintained. The eggs were from an improved Barred Rock bred-to-lay strain, and the introduc-

tion of this breed into the rural districts is expected to prove of lasting benefit to the whole country.

It was suggested that part of the cost (say one-half) be borne by the school board and part by the pupils, thus placing the cost to the pupil at so reasonable a figure that the project would be within reach of all. The part of the expense borne by the school board may be charged to the agricultural account (P. S. Regulations 1915, 16 (1), page 85), as the hatching and rearing of the brood is a legitimate and useful home project for a pupil of the third, fourth or fifth forms.

High Schools:—Eight secondary

schools received eggs for home project work in connection with the classes and these eggs were incubated in the school buildings under the direction of the teachers. In all there were 2,576 eggs distributed.

Public and Separate Schools:—Pupils in these schools securing eggs by this arrangement are expected to manage the incubation by the natural method at home, and attend to the rearing of the chicks. The results of these projects will be dealt with in the various schools concerned in the fall term. In this work 152 schools participated and 30,940 eggs were distributed to these schools.

MANITOBA

BY S. T. NEWTON, B.S.A., SUPERINTENDENT OF EXTENSION SERVICE

DURING the past season eggs for hatching purposes were supplied only to the new boys' and girls' clubs. However, a considerable number of the old clubs supplied new club members with eggs which they secured and paid for through our exchange service. Altogether 4,000 eggs were supplied in this way, in addition a large number of club secretaries were put in touch with responsible poultry raisers and bought their eggs direct. The number of eggs required for the new clubs was 1,530 dozens.

Naturally, when eggs are purchased in one part of the province and re-shipped to another, considerable loss is entailed through breakages, and occasionally through chilling, when the temperature happens to drop while the eggs are in transit,

and to the casual observer it would seem that the egg phase of boys' and girls' club work is not a satisfactory one.

However, the fact remains that pure-bred poultry is now found on thousands of Manitoba farms, and a deep interest taken in the poultry, where four years ago a nondescript variety was kept and they were just known as hens, and, while the number of chickens secured per hundred eggs bought will average only 45, yet the number has been sufficient for the nucleus of large numbers of very respectable flocks.

During successive years it is felt that it will not be necessary to supply any eggs free to club members as pure-bred poultry can be found in every neighbourhood.

ALBERTA

BY A. W. FOLEY, POULTRY SUPERINTENDENT

THE Alberta Provincial poultry plant which is located on the university grounds, South Edmonton, was established eight years ago in order to encourage the production of more and better poultry. At that time the homesteaders and new settlers were desirous of increasing and improving their flocks, but found that, owing to the lack of good breeding stock, this was extremely difficult. Accordingly, the plant was established to meet this requirement and at the same time to be a practical demonstration in the matter of suitable housing, and in the care and management of poultry generally. The breeds selected for the work were Barred Rocks, Buff Orpingtons, White Wyandottes and Rhode Island Reds, as these breeds were in greatest demand. A pen of White Leghorns has also been kept as a representative of the non-weight varieties, although the demand for the stock and eggs of this variety has been very limited compared with that of other breeds.

THE POLICY FOLLOWED

In the early days of the plant, the distribution of eggs and male birds was the chief feature. Very few pullets have at any time been sold. It has been the policy, however, to sell females each year at the close of the breeding season to make room for the young stock the following winter. These females were sold at \$1 each and rendered good service as breeding stock the following season. At this time, and in fact until recently, male birds were also sold at \$1 each and eggs for hatching at \$3.50 for 50 eggs and \$6 for 100. This price was so low that most of the orders called for 100 eggs and were used to fill incubators. As the object of the work was to assist poultry men in securing foundation stock,

it was found necessary to reduce the limit to 50 eggs per person. For several years following, eggs were sold at \$1 per setting of 13 eggs, three sittings for \$2.50 and \$3 for 50 eggs.

Owing to the ever-increasing demand for hatching eggs, it was considered advisable to still further reduce the limit of eggs supplied and in 1917 the limit was three sittings, the price of eggs remaining the same, namely \$1 per sitting and three sittings for \$2.50.

SHIPMENT OF CHICKS

Early in 1913, a 1,200 egg incubator was installed in the plant and the experiment was made of shipping day-old chicks. This proved a success and orders are received each season for many times the number that can be supplied. One shipment of fifty chicks was forwarded to the farthest shipping point in the province, with three express transfers, and the customer raised the entire fifty to maturity. Another fifty was shipped to Calgary and on August 28th a photo was received of 46 of the matured chicks. Only two chicks had died, and one of the pullets commenced laying on Aug. 28th. The advantages of this system of distribution are that the customer knows exactly what he will receive for his money, because, if proper arrangements are made for the chicks on arrival, there is not the amount of risk there is when eggs are shipped. Moreover, when sending out eggs, there are often a number broken and rough handling may reduce the hatchability of the eggs that remain. There is also no risk with a sitting hen or an incubator.

A SUPERABUNDANCE OF ORDERS

In 1913 there were 7,927 orders for young chicks. Accordingly the ca-

capacity of the incubator was increased the following spring from 1,200 to 3,600 eggs. The price charged for the chicks is \$4 for 25, with a maximum limit of 25 to each customer.

As the plant's capacity is even yet somewhat limited, orders are received each season for thousands of eggs and day-old chicks that cannot be supplied. However, the poultry industry has made rapid advancement in the last few years and many breeders of pure-bred poultry may be found in all parts of the province. When the plant is unable to fill orders, applicants are referred to reliable breeders as near their home district as possible.

Owing to having supplied 2,254 eggs of various breeds to rural schools it was necessary to cancel most of the chick orders in 1916.

EGG AND DAY-OLD-CHICK SHIPMENTS

1915	Eggs	Chicks
Barred Rocks.....	1,616	510
White Wyandottes.....	655	250
Buff Orpingtons.....	534	115
Rhode Island Reds.....	630	290
White Leghorns.....	115	62
	3,550	1,227
1916		
Barred Rocks.....	2,114	136
White Wyandottes.....	1,440	....
Buff Orpingtons.....	853	....
Rhode Island Reds..	768	....
White Leghorns..	188	100
	5,363	236
1917		
Barred Rocks.....	1,469	430
White Wyandottes... ..	676	425
Buff Orpingtons.....	962	249
White Leghorns..	488	188
Rhode Island Reds..	845	162
	4,440	1,454

AN AGRICULTURAL INSTRUCTION ACT APPOINTMENT

On the recommendation of the Minister of Agriculture, Honourable Martin Burrell, Mr. J. W. Mitchell, B.A., was appointed on June 30, 1917, to assist in carrying out the provisions of THE AGRICULTURAL INSTRUCTION ACT. Mr. Mitchell's duties are to inspect, examine and report upon the work. Mr. Mitchell is well qualified in scientific and practical agriculture. After graduating in science at Queen's Uni-

versity, he took a special course in Dairying at the Ontario Agricultural College, and later became an instructor. He subsequently became Superintendent of the Kingston Dairy School and afterwards Professor of Dairying at Manitoba Agricultural College and Commissioner of Dairying for the Province. Recently, Mr. Mitchell has been Superintendent of Live Stock and Dairying in New Brunswick.

PRINCE EDWARD ISLAND

RECENT AGRICULTURAL LEGISLATION

A couple of Acts relating to agriculture were passed at the session for 1917 of the Prince Edward Island Legislature. One of these, entitled "An Act for Promoting the Settlement of the Unused Lands and the Development of other Resources of the Province", has for its object the making of reasonable provision for the settlement of returned soldiers by organizing and preparing areas of land for the purpose. The Act gives the Lieutenant-Governor in Council power of expropriation when considered necessary. For the purposes of the Act debentures to the extent of \$20,000 may be issued to run for a period not in excess of twenty years.

The second agricultural measure passed is "An Act to Incorporate the

Prince Edward Island Co-operative Egg and Poultry Association." The usual corporate rights are given with power to borrow and loan. The association is to have no share capital, but is to create a fund of not less than \$15,000, nor more than \$50,000, by means of notes from egg circles and membership fees. The directorate is to consist of ten members chosen from delegates from egg circles at the annual meeting. Egg circles must be approved by the executive of the association. A circle must have seven directors, including a president, vice-president and secretary treasurer. Act 4 Geo. V., Cap. 22, incorporating the Prince Edward Island Co-operative Egg and Poultry Association, and amendments thereto, are repealed.

APPROPRIATIONS FOR AGRICULTURE

The following appropriations for agricultural purposes in 1917 were passed:

Commissioner of Agriculture, part salary.....	\$ 900
Travelling expenses.....	350
Professor of Agriculture, part salary.	1,400
Travelling expenses.....	300
Departmental expenses and contingencies.....	1,200
Printing and stationery.	1,000
Exhibitions and live stock judging.....	8,780
Farmers' Institutes and educational work.....	2,070
Encouragement of field crops, horticulture, dairying and poultry raising.....	3,000
Vital statistics.....	700
Total.....	\$19,700

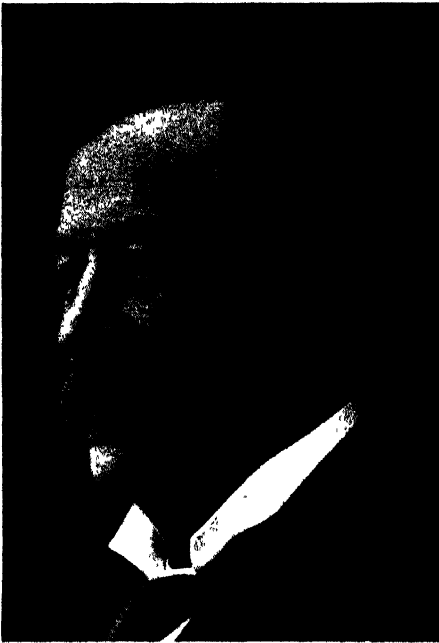
NEW BRUNSWICK

RECENT AGRICULTURAL LEGISLATION

AT the session of the legislature of New Brunswick which closed on June 22nd, 1917, the amendments to the Act for the Protection of Sheep against Dogs was the most important, so far as the Department of Agriculture is concerned. Formerly, fifteen ratepayers in any parish who were householders could petition the municipal council not to enforce the Act levying a tax upon dogs. Later an amendment was passed, whereby

passed at the recent session provide that upon the petition of twenty-five ratepayers, being householders in any county, the council must pass the necessary by-laws providing for the machinery to enforce the Act as upon the statute books. The tax upon dogs and spayed bitches is \$1.00 and upon bitches \$5.00 per annum. The enforcement is no longer a matter for the county councils to deal with as they might wish, but they are forced to act upon the presentation of a petition. The taxes collected are to constitute a fund from which damages will be paid at the end of every fiscal year amounting to two-thirds of the actual loss sustained by the sheep raiser. If this fund is not sufficiently large to meet all demands there, they are to be met pro rata. Every incorporated town or city within a municipality where the Act is enforced must pay to the municipality fifteen per cent of the amount collected as dog taxes within such town or city, and this sum becomes part of the fund to reimburse sheep raisers who have suffered from dogs.

An Act was also passed to facilitate the drainage of farm lands. When it is considered necessary to run a ditch or drain through adjacent property, the party desiring the same can apply to the municipal council for permission to carry out his project. On receipt of the application the council is to appoint a civil engineer or land surveyor to report upon the need for the ditch or drain and the damage that will be caused to the lands through which it may run. If the work cannot be carried out by mutual agreement the council may take such action as it deems expedient. If the person desiring the



HON. J. F. TWEEDDALE.
Minister of Agriculture for New Brunswick

fifteen ratepayers in any parish where a petition had been presented to prevent dog taxation could petition to have the original Act enforced. The result was that the Act was not enforced in any part of the province. The amendments

ditch or drain deposits sufficient funds to cover all costs the council can give permission to have the work done.

There was further an Act passed giving municipalities the power to raise twenty-five thousand dollars

for the purchase of food or fuel to relieve the undue pressure upon the residents. The city of St. John is empowered to raise fifty thousand dollars for the same purpose. The measure is to be cited as "The Act relating to the High Cost of Living."

APPROPRIATIONS FOR AGRICULTURE, 1917

Civil Government.....	\$ 6,058.35
Grants to Societies.....	18,000.00
Butter and Cheese Factories.....	500.00
Encouragement of Stock Raising and Encouragement of Dairying.....	6,500.00
Maritime Stock Breeders' Association.....	200.00
Encouragement of Poultry Raising.....	1,500.00
Encouragement of Horticulture.....	2,500.00
Standing Crop Competition and Seed Fairs.....	4,000.00
Provincial Dairy School.....	600.00
Brown Tail Moth Extermination.....	2,911.62
Lime Rock Crusher and Power.....	500.00
Bonus to Wheat Mills.....	2,000.00
Bonus to Mud Dredges for Fertilizers.....	500.00
Exhibitions.....	5,000.00
Farm Settlement Board.....	1,500.00
Greater Production.....	5,000.00
Seed, Purchase of.....	30,000.00
*Encouragement of Poultry-raising.....	500.00
*Bonus to Wheat Mills.....	1,000.00
Travelling Expenses, Contingencies, Miscellaneous and Insurance.....	5,250.00
Total.....	\$94,019.97

*Supplementary estimates.

DISTRICT REPRESENTATIVES AND OTHER APPOINTMENTS

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

THE Department of Agriculture of New Brunswick has decided to adopt the District Representative or District Agent system of assistance to farmers. The divisions will not depend altogether upon the present county lines, but counties may be grouped or sections of counties may be grouped. It is very necessary that men be placed in districts in New Brunswick who are familiar with the particular forms of agriculture, and also in some sections it is necessary to engage men who are able to speak two languages, English and French. Three appointments have already been made:

J. H. King, B.S.A., to represent Westmoreland and Albert.

E. A. Taylor, B.S.A., to represent Queens and Sunbury.

Antoine C. Belliveau, to represent Kent county.

Mr. M. A. MacLeod, until June 1st editor of the *Maritime Farmer*, at Sussex, has been appointed Superintendent of Agricultural Societies for the province. Mr. MacLeod was connected with the *Maritime Farmer* for eleven years and is closely in touch with agricultural conditions throughout the province. He has been a very active worker in co-operative enterprises for a number of years and the success attending some ventures are due to his initiative.

Mr. Thomas Hetherington, B.S.A., a graduate from Macdonald College, 1917, has been appointed Live Stock Instructor for the province. He was on the staff of the *Farm and Dairy* for a few months.

NOVA SCOTIA

AGRICULTURAL INSTRUCTION ACTIVITIES

BY J. G. ARCHIBALD, COLLEGE OF AGRICULTURE, TRURO

ENTOMOLOGICAL WORK

UNDER the direction of Prof. W. H. Brittain, Provincial Entomologist, the following work is being carried on:—

At Truro:—

(1) Investigation of the life history and control of the cabbage root maggot.

(2) Potato beetle and potato blight investigation. In this latter particular attention is being paid to the following points:

- (a) The effect of the carrier on the toxic value of the poison.
- (b) The effect of the poison on the fungicidal value of the carrier.
- (c) The fungicidal value, if any, of the various arsenical poisons.
- (d) The correct strength of the arsenical poisons for use with Bordeaux mixture and alone.

In the Annapolis Valley:—

(1) Comparative tests on the value of various combinations of spray materials and dust mixtures.

(2) Demonstrations are being held at a number of points on the control of the green apple bug.

(3) The detailed study of orchard aphids and methods of control which has been carried on for the past three years is being continued in the field laboratory at Kentville.

A number of miscellaneous insects are also being studied. Two bulletins have recently been published, one entitled "The Apple Maggot in Nova Scotia" and the other "The Green Apple Bug in Nova Scotia." A popular press bulletin on the spraying of potatoes has recently been issued and is being distributed among the farmers.

Apiary inspection work for the year has been carried on systematically and thoroughly by Mr. C. B. Gooderham, who has recently severed his connection with the

Department and assumed the duties of assistant in the Division of Apiculture at Ottawa.

DEPARTMENT OF CHEMISTRY

(1) The systematic survey of Nova Scotian soils from the chemical standpoint is being prosecuted. Two of the more important agricultural districts, namely, the Stewiacke and Margaree Valleys, have recently been visited and representative samples have been taken from the various soil types in these districts. It is planned to overtake at least two other districts this year. Special attention is being paid to the question of soil acidity and where lime has been recently used an endeavour is being made to ascertain what benefit has accrued, if any.

(2) A study is being made of the various seaweeds growing along our coasts, both by actual chemical analysis and by box experiments.

DEPARTMENT OF HORTICULTURE

The principal activities of this department carried on under THE AGRICULTURAL INSTRUCTION ACT are confined to:—

(1) *Model orchards:—*These were established in various parts of the province several years ago. These orchards are planted by the Department and are under its supervision thereafter. The work in connection with these orchards is half paid for by the federal grant and half by provincial aid.

(2) *Demonstration orchards:—*These are bearing orchards of which the Department agrees to take charge for several years in order to demonstrate to the farmers just how a bearing orchard should be cared for.

(3) *Demonstration vegetable gardens*.—At several of the places where model or demonstration orchards are located, demonstration vegetable gardens have also been established. The object of these is to show the people what garden crops are most suited to their soil and climatic conditions and just how much valuable food may be obtained for household use from the home garden. Canning demonstrations will be held at several of these gardens in the autumn. These activities require the attention of two special assistants whose sala-

ries are paid from the funds provided under THE AGRICULTURAL INSTRUCTION ACT.

Prof. M. Cumming, Secretary for Agriculture, has just returned from a trip to the upper provinces and the United States, during which he investigated the problem of light tractor ploughs for this province. As a result of his visit he has practically completed plans to have a number of tractors operated experimentally in Nova Scotia during the coming autumn.

ONTARIO

APICULTURE SUMMER COURSE, O. A. C., 1917

THE 1917 summer short course in apiculture held at the Ontario Agricultural College, Guelph, was a decided success. Ideal weather conditions prevailed during almost the entire week permitting day sessions to be held in the apiary as advertised in the programme, without change in the schedule. This gave the students time and opportunity for actual practice in the handling of bees. Owing to the extremely late spring and general shortage of help in the country the attendance was much smaller than was expected. In all 16 students were enrolled and took a keen interest in the work.

The day sessions were of a practical nature and were conducted by Morley Pettit, Provincial Apiarist, assisted by E. G. Carr, Deputy State Bee Inspector, New Egypt, N.J., and Jas. Armstrong, Vice-President Ontario Bee-keepers' Association, Rt. 1, Selkirk, Ont. The object of this course is to enable the students to put into practice the knowledge gained at the January course,—“To know by doing.” Wintering,

spring management, swarm control, bee disease, queen rearing, extracting and many other essential points were taken up and thoroughly explained and demonstrated.

In the evenings illustrated lectures were given and dealt with the broader phases of apiculture. These lectures were well attended not only by the students but by many outsiders who were interested in apiculture and who were unable to attend the day sessions. Mr. E. G. Carr gave an interesting talk on “Bee-keeping Conditions in North Carolina,” and dealt with conditions as he found them in that state recently while making an apiculture survey for the United States Federal Government. Mr. Pettit's lecture on “The Development of the Bee-keeping Industry in Canada,” was illustrated by views of bee-keepers and their apiaries in all the provinces. He pointed out the great possibility of the honey industry in Canada and showed how Canadian bee-keepers can help and are helping to produce a great quantity of food for the nation.

FARMERS' AUTOMOBILE TOUR

THE third annual automobile tour of the farmers of Dufferin county under the guidance of Mr. H. A. Dorrance, B.S.A., District Representative, took place on July 3, 4 and 5, the route being through the counties of Wellington, Middlesex and Oxford and a part of Perth and Waterloo. The party left Orangeville in five cars, the earliest stop being made at Guelph, where the Ontario Agricultural College and the Winter Fair Buildings, where wool-grading was in progress, were visited. At the College the experimental plots were inspected, a special feature pointed out being the excellent results that are apparently being obtained from the annual pasture mixture that the College is fostering, consisting of one bushel

each of wheat, oats and barley and seven pounds of red clover seed per acre. Other items of special interest were some of the new strains of oats being developed and the method of growing mangel seed. From Guelph the tour led through Kitchener, Stratford and London, from which point several farms were visited. Passing Strathroy, the party took in the Muncey Institute, where Indian boys and girls are trained. Wellwood farm received attention and thence the route laid through Oxford county. The outstanding features of the district along which the tour laid were the generally good roads, the well-built and well-kept farm homes, and the large number of silos that were seen.

SHORT COURSES FOR LIVE STOCK AND FIELD CROP JUDGES

AFTER a lapse of one year the Ontario Department of Agriculture has resumed the short courses for judges supplied to agricultural societies for the fall fairs and field crop competitions. The courses were held at the Ontario Agricultural College, Guelph, on July 2nd, 3rd and 4th, and at the Central Experimental Farm, Ottawa, on July 9th, 10th and 11th. At Guelph there were 200 judges present from the counties west of York and Simcoe, inclusive, and Muskoka. At Ottawa 125 attended from east of York and Simcoe and from Northern Ontario.

The Department of Agriculture, through the Agricultural Societies Branch, of which Mr. J. Lockie Wilson is superintendent, supplies judges to 214 fairs held by agricultural societies, and to 177 agricultural societies holding field crop competitions. The field crop competitions are more extensive than usual this year, embodying 3,500 fields and including crops of wheat, oats, barley, corn, potatoes, clover,

turnips, mangels, beans, and peas.

The short courses followed a regular programme. The judges were divided into classes for heavy horses, light horses, beef cattle, dairy cattle, sheep, swine, poultry, and field crops. For the live stock classes exhibits of animals of the respective classes were brought before the judges and placed in charge of an official of the Ontario or Dominion Departments of Agriculture. The animals were placed by the judges, and after a number of them had given oral reasons for their decisions the official in charge of the class gave his placing and his reasons therefor. In the field crop classes practically the same course was followed, but, in addition, score cards were used. The judges met at the experimental plots; each scored the crops according to his judgment, and after some discussion the official in charge gave out his placings with his reasons. As a result of these courses it is expected that all the judging throughout the province will be carried on by trained men in a uniform manner.

LIVE STOCK JUDGING COMPETITIONS

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER OF AGRICULTURE

AS has been previously mentioned in THE AGRICULTURAL GAZETTE the Ontario Department of Agriculture through the District Representatives has been conducting courses in agriculture for farmers' sons during the winter months. The judging of live stock in addition to the judging of field crops and roots is one of the prominent features of this course and has undoubtedly done much to develop the young farmers throughout the province along these lines. Two years ago inter-county live stock judging competitions were inaugurated in connection with the Winter Fairs at Guelph and Ottawa. A great deal of interest has been taken in these two contests as may be shown by the fact that practically every county in the province having a District Representative was represented with a team each year.

This year the Canadian National Exhibition, Toronto, and the Central Canada Exhibition, Ottawa, are putting on for the first time a judging contest open to farmers' sons under

26 years of age who are not graduates of an agricultural college. The following are the rules and regulations and prizes offered in each of these contests:

CANADIAN NATIONAL EXHIBITION,
TORONTO

Competitions will be held under the supervision of the Agricultural Department of the Ontario Government, open to farmers or farmers' sons under 26 years of age. Graduates of an agricultural college will not be eligible.

The judges for the competitions will be supplied by the Ontario Department of Agriculture.

Entries must be made on the regular entry forms and received by the manager of the exhibition, Dr. J. O. Orr, not later than Tuesday, August 14th.

Contestants will be allowed 25 minutes for placing and reasons.

Contestants will be permitted to enter in one class of live stock (including poultry) and either fruit and vegetables, or grain and roots.

Contestants will be notified of the days and hours that the judging will take place.

Prizes will be awarded on a basis of 100 points; placing, 50 points; reasons, 50 points.

PRIZES FOR LIVE STOCK:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
\$20	\$19	\$18	\$17	\$16	\$15	\$14	\$13	\$12	\$11	\$10	\$9	\$8	\$7	\$6	\$5

PRIZES FOR POULTRY, GRAIN AND ROOTS, FRUIT AND VEGETABLES:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
\$15	\$14	\$13	\$12	\$11	\$10	\$9	\$8	\$7	\$6	\$5	\$4	\$3	\$2	\$1	50c

Class A—Heavy Horses.
 " B—Beef Cattle.
 " C—Dairy Cattle.
 " D—Sheep.

Class E—Swine.
 " F—Poultry.
 " G—Grain and Roots.
 " H—Fruit and Vegetables.

CENTRAL CANADA EXHIBITION,
OTTAWA

In order to encourage a deeper interest in agriculture on the part of young men in Canada, the Central Canada Exhibition at Ottawa has inaugurated a special competition to be open to farmers' sons under 26 years of age. Graduates of an agri-

cultural college will not be eligible. Each contestant will be permitted to enter in not more than two classes of live stock.

PRIZES ARE AS FOLLOWS

1	2	3	4	5	6	7	8	9
\$15	\$14	\$13	\$12	\$11	\$10	\$9	\$8	\$7

Classes are, Heavy Horses; Beef Cattle; Dairy Cattle; Sheep; Swine.

The Ontario Department of Agriculture also conducts various competitions with farmers' sons who have taken the course in agriculture under the District Representatives such as acre profit, baby beef, feeding hogs for profit and dairy profit. The Central Canada Exhibition is anxious to encourage the bacon hog industry in Eastern Ontario and with a view to this end have arranged for a Junior Farmers' Inter-County Bacon Hog Contest. This contest, I believe, will create a great deal of interest and do much toward encouraging this very important industry. The following are the rules and regulations and prize list of the contest:

For pair bacon hogs fed and cared for by contestant—open to farmers' sons under 26 years of age. Counties will be grouped and prizes given in each group as follows:
1st \$30; 2nd \$25; 3rd \$20; 4th \$15; 5th \$10

Group I.—Northumberland; Peterborough; Hastings; Prince Edward.

Group II.—Lennox & Addington; Frontenac; Leeds.

Group III.—Renfrew; Lanark; Carleton; Russell.

Group IV.—Grenville; Dundas; Stormont; Glengarry; Prescott.

SPECIALS FOR JUNIOR FARMERS INTER-COUNTY BACON HOGS

For best pair of bacon hogs exhibited in class open only to winners of Groups I, II, III, IV of class—.

1st \$40; 2nd \$30; 3rd \$20; 4th \$10.

IMPROVING THE POTATO INDUSTRY IN ONTARIO

BY R. S. DUNCAN, B.S.A., DISTRICT REPRESENTATIVE SUPERVISOR

AT a special meeting held in the office of the Department of Agriculture, Parliament Buildings, Toronto, on Thursday, July 19th, the question of "Improvement of the Potato Industry" was up for discussion.

Those present at the meeting were Dr. C. A. Zavitz, Experimentalist, O.A.C., Guelph; T. G. Raynor, Seed Branch, Ottawa; G. C. Cunningham, W. A. McCubbin and George Partidge of the Dominion Laboratory of Plant Pathology at Fredericton, N.B., St. Catharines and Ottawa, respectively; C. F. Bailey, Assistant Deputy Minister; F. C. Hart, Director Co-operation and Markets Branch; Justus Miller, Assistant Commissioner of Agriculture and R. S. Duncan, District Representative Supervisor. Prof. W. T. Macoun of the Central Experimental Farm and L. H. Newman, Secretary, Canadian Seed Growers' Association, were invited but were unavoidably absent.

The meeting was called primarily to discuss the potato industry as it effected Ontario. Briefly stated the discussion of the conference was con-

finied largely to the following headings:

1. The establishment of seed potato plots for rural school fairs.
2. The control of potato diseases.
3. The selection of a potato farm in Northern Ontario for the development of further tests and strains with potatoes.
4. The working up of a profitable trade in potatoes by the potato growers in New Ontario Districts who will produce the seed and potato growers in Old Ontario who will produce the commercial crop.
5. The conduction of variety and strain tests of potatoes by District Representatives.
6. The conduction of demonstrations in spraying for control of late Blight.
7. The selection of the following varieties with the object of trying to standardize the potato industry and to secure a greater uniformity throughout the province:
Early: Extra Early Eureka; Irish Cobbler.
Late: Green Mountain; Empire State; Dooley.
8. The encouragement of the formation of seed centres operating under the rules of the Canadian Seed Growers' Association.

In reference to the establishment of seed potato plots by District Representatives in order to obtain

pure seed, free from disease for distribution to the pupils in the rural school fair movement the following regulations were issued early in the spring through this office:

REGULATIONS GOVERNING SEED POTATO DEMONSTRATION PLOTS FOR PROCURING POTATOES FOR SCHOOL FAIRS

1. Choose the variety best adapted to the district which you wish to improve and perpetuate. (We want to avoid multiplicity of varieties.) Obtain from a reliable source from 4-6 bushels of pure, clean seed, true to name of the chosen variety.

Note:—If such tubers cannot be procured do not attempt to conduct this seed plot for 1917.

2. Select some farmer in your best potato-growing section, preferably on lightish soil, to conduct this seed plot, who will agree to give this plot special attention as to fertilizing and cultivation.

3. The District Representative should treat the tubers for scab according to the recognized practice.

4. The District Representative is to furnish material to spray the plot with Bordeaux mixture and is to assist in spraying the potatoes from 4 to 6 times, depending on weather conditions. This will make a good demonstration plot for the control of blight.

Accounts for spray material are to be charged to the County Grant where sufficient funds are still available.

5. A hill selection should be made at harvest time in order to select from 6-8 bushels of good tubers with which to

continue the seed plot the following year. These tubers should be stored in a suitable place in a separate bin. The District Representative will be expected to assist the farmer in making this hill selection.

6. The District Representative should secure the option of purchasing what seed potatoes are required for school fair and other purposes at the prevailing market price for seed potatoes March 1st of the following year. It is to be understood that the farmer will store potatoes until after danger of frost, when delivery may be made.

All told 30 District Representatives are operating seed potato plots with one or other of the approved varieties previously mentioned.

As to disease control, Messrs. Partridge and McCurry who are specialists in potato diseases from the Dominion Laboratory of Plant Pathology at Ottawa are now inspecting these school fair seed plots with the District Representatives with the object of roguing the plot for disease and staking a number of the most healthy plants with a view to hill selection of tubers at harvest time.

At the conclusion of this work these men will also inspect fields of potatoes in a given area in Western Ontario, Caradoc township in Middlesex county, and in Eastern Ontario, Carleton county.

SUMMER PRUNING THE YOUNG APPLE ORCHARD

BY E. F. PALMER, B.S.A., DIRECTOR, HORTICULTURAL EXPERIMENT STATION

AT the Horticultural Experiment Station, Vineland, Ontario, an experiment in the pruning of young apple trees has been under way since 1914. The following is a brief description of the experiment and a statement of the results obtained to date:

The apple orchard at the experiment station, in which the pruning work is being conducted, consists of 646 trees, including 170 trees of standard varieties: Hyslop, Spy, Greening, Baldwin, King, Hubbardston, Cranberry, Jonathan and McIntosh,

and 476 trees of fillers, Dudley, Duchess, Wagener, Wealthy and Ontario. The orchard was planted in the spring of 1911 and the pruning experiment started in the spring of 1914. Three systems of pruning are being followed—winter pruning, summer pruning, and little or no pruning.

Winter Pruning:—These trees receive the usual treatment as practised in Ontario, being severely cut back and thinned out in March or April. The object is to form a framework that is pleasing to the eye, and

at the same time will carry a maximum load of fruit without damage when the tree comes into bearing.

Summer Pruning:—The trees are well thinned out in August and cut back only enough to keep the trees within bounds, which usually involves simply pinching out the terminal buds from the higher branches. The object is as much as possible to admit a maximum of sunlight and air to develop as many fruit buds and fruit spurs as possible, but at the same time not to sacrifice the shape of

the tree any more than is necessary. Early bearing is the object in view.

Little or No Pruning:—These trees receive no pruning whatever except that a few cross and broken or otherwise injured limbs are removed. They are left as much alone as is conveniently possible.

Careful records are made of the size and vigour of the trees, blossoming dates, number of fruit spurs and fruit set, quantity of fruit harvested, and comparative size, colour and keeping quality of the fruit.

TABLE I—SUMMARY OF FRUIT PRODUCED: 1916. PRUNING EXPERIMENT, SECTION 7

METHOD.	Number of Trees	Total Weight of Fruits	Total Number of Fruits	Average Weight of Individual Fruits
Unpruned.....	207	3,260 lb.	14,416	.2261 lb.
Winter pruned.....	228	227 "	781	.2906 "
Summer pruned.....	209	1,820 "	7,169	.2538 "

As will be readily seen from a careful study of the above table, the results to date are very uniform throughout. The summer-pruned and unpruned trees were loaded with fine marketable fruit both in 1915 and 1916, while the winter-pruned trees, with the exception of two or three of the filler varieties, have borne practically no fruit. (In 1915, the winter-pruned trees bore no fruit, the summer-pruned trees 127.7 lb., and the unpruned trees 209.4 lb.). There appears to be no doubt that summer pruning will

bring the young orchard into profitable bearing much quicker than the plan usually followed of heading back severely each year. The unpruned trees, of course, have given similar results, but due to this lack of pruning the trees are not in as good condition for future bearing. They are more straggly, and have too many branches, thus not allowing as free a circulation of air or as much sunlight as is desirable for the control of insect pests and diseases and the production of the best quality of fruit.

TABLE II—AVERAGE DIAMETER IN INCHES OF TRUNKS OF TWO STANDARD AND TWO FILLER VARIETIES

VARIETY	Unpruned	Winter Pruned	Summer Pruned
Wealthy.....	2.267	1.967	2.130
Duchess.....	2.093	1.703	1.942
Baldwin.....	2.369	2.062	2.337
Greening.....	2.489	2.052	2.393

The evidence presented in Table II is fully as marked as in the previous table, and is again strongly in favour of the unpruned and summer-pruned trees. It is of interest also to note that the difference between unpruned and summer-pruned is quite marked, in the case of the earlier-bearing smaller-growing varieties, Wealthy

and Duchess, while in the case of the later-bearing, larger-growing varieties, Baldwin and Greening, it is comparatively small.

The differences in the average diameters of the trunks in the three systems of pruning is, of course, correlated with differences in the general size and vigour of the trees.

DISTRICT REPRESENTATIVES CONFERENCE

UNDER the direction of Mr. C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture, the District Representatives of the Ontario Department of Agriculture met in conference at the Russell House, Ottawa, on July 10th, 11th, 12th and 13th. In addition to following a regular prepared programme, addresses were delivered by Mr. W. J. Black, Commissioner under THE AGRICULTURAL INSTRUCTION ACT; Dr. James W. Robertson of the Commission of Conservation; Mr. H. S. Arkell, Acting Live Stock Commissioner; Mr. F. H. Auld, Deputy Minister of Agriculture for Saskatchewan; Mr. S. T. Newton, Director Extension Service, Manitoba; Mr. F. N. Savoie, Secretary, Department of Agriculture, Quebec, and by District Representatives from the provinces of Saskatchewan and Quebec.

On July 10th and 11th the District Representatives visited the Central Experimental Farm where luncheon was served and brief addresses delivered by Mr. J. H. Grisdale, Director, Dominion Experimental Farms; Mr. W. J. Hanna, Food Controller for Canada; Mr. Wm. Smith, M.P.; and Mr. T. Wallace, M.P. After the luncheons, tours of the fields and experimental plots, barns and stables and other points of interest were made under the direction of Professor Grisdale, Mr. E. S. Archibald and other members of the Experimental Farm staff. During these tours the work and experi-

ments being conducted were fully explained by the officials in charge.

The programme of the conference included discussions on the following subjects: How to make a special course in agriculture more effective; the work of the Junior Farmers' Improvement Associations for one year; Competitions—feeding hogs, dairy profit, baby beef, acre profit and poultry for profit. In connection with the subject of competitions, the discussion brought out many interesting features, making it necessary to appoint committees to deal with these competitions so that the greatest amount of success would be the outcome.

Farm Management, Surveys, and Book-keeping received treatment at the hands of Mr. L. H. Newman, Secretary, Canadian Seed Growers' Association, Mr. R. S. Duncan and Mr. J. E. McRostie. In the discussion of this subject it was made clear that any system adopted should suit the kind of farming being followed, simplicity being the keynote.

Mr. J. W. Stark, District Representative for Peel County, and Mr. Justus Miller, Assistant Commissioner of Agriculture for Ontario, outlined and described the rural survey being made of Caledon township in Peel county, the purpose of which is to secure definite information with regard to rural conditions so that the rural problem may be successfully combated and the township made into a model township. Prof. R. Harcourt, Professor of

Chemistry at the Ontario Agricultural College, outlined the soil surveys which, under his supervision, are being made throughout the province of Ontario.

The second day of the conference was set apart for the discussion of co-operative organizations. The discussion on this subject, led by Mr. W. P. Macdonald, District Representative for Lambton county, demonstrated the progress co-operation has made throughout Ontario, which is due in a large measure, to the successful efforts of the District Representatives. Mr. Macdonald in his remarks outlined the principles and objects governing the Lambton County Co-operative Association which has for its object the buying and selling co-operatively of all farm produce. This association, as pointed out by Mr. Macdonald, is managed by one man, a method which, the speaker claimed, is one of the chief essentials to success. Lambton county also has fifty-two farmers' clubs, the majority of which meet at least once every two weeks throughout the year.

Mr. W. H. Smith, B.S.A., outlined the co-operative work being conducted in Leeds county. Mr. F. C. Hart, Director of Co-operative Organizations, Toronto, and Mr. R. W. Wade, Director Live Stock Branch, Toronto, took a prominent part in the discussion on co-operation, the latter dealing particularly with the co-operative handling and selling of wool by the Ontario Sheep Breeders' Association, which had this year been attempted for the first time.

Hydro Electric Power on the farm was discussed by Messrs. J. W. Purcell, H. C. Duff and G. R. Green.

The improvement of the potato industry was discussed by Mr. T. G. Raynor of the Seed Branch, Ottawa, Dr. C. A. Zavitz, Ontario Agricultural College, Guelph, Mr. W. A. McCubbin, Mr. L. H. Newman and Mr. R. S. Duncan. As a result of this discussion, a special meeting was

arranged to be held in Toronto on Thursday, July 19th, 1917, at which a definite policy for the province with regard to the potato industry was formulated.

Labour Bureaux and other work was discussed by Dr. W. A. Riddell, Messrs. R. A. Finn, R. Schuyler, and J. S. Knapp. This discussion brought to light many of the difficulties experienced by the District Representatives in their efforts to cope with the farm labour problem and that the boys who had made application for farm labour and been placed upon farms had given general satisfaction.

The third day of the conference was occupied in a discussion of school fairs. Organization and methods of conducting school fairs were freely discussed and much helpful information resulted. Different methods are followed in different counties for the organization of rural school fair boards. This work requires considerable time and makes necessary the holding of many meetings. To do this with a minimum expenditure of time, some of the District Representatives had followed the plan of calling together the presidents and secretaries of these boards and, in assembly, giving them full instruction relative to the holding of a meeting and the appointment of officers. From this meeting the presidents and secretaries were able to return to their own districts and do the necessary organization work for their district school fair. Another plan which had met with success, was the organization of school fair boards by correspondence.

Other subjects receiving attention were the Home Garden Contest, Systems of Collecting Information, and Ploughing Matches. With regard to the latter, Mr. Bailey announced that arrangements were under consideration whereby ploughing matches would be conducted by Junior Farmers' Improvement Associations in the various counties. At provincial ploughing matches, held in the province, there is a

general lack of young men participants. To overcome this and to encourage the young men to take a greater interest in good ploughing, the scheme outlined by Mr. Bailey is being carefully considered.

The discussion on the subject of Farm Drainage was led by Mr. J. R. Spry of the Ontario Agricultural College, who dealt chiefly with the various laws relating to drainage and to the procuring of loans of money by farmers for this purpose. Farm Drainage formed the subject of a very free and able discussion, the result of which was a general recommendation that there should be available a number of well-trained drainage men, who could make surveys for farmers and adjust the many drainage problems and difficulties experienced by the District Representatives in their respective counties.

Under the subject of Variety Tests, the discussion brought out clearly that much good work was being accomplished, but that greater success and more influence resulted from work done on individual farms and for individual farmers, the same being true with regard to field and live stock feeding demonstrations. With regard to the latter, Mr. E. K. Hampson, District Representative for Welland county, and Mr. W. D. Jackson, District Representative for Carleton county, outlined and described work performed in their respective counties in the way of assisting farmers to compute balanced rations for special feeding purposes. Work of this nature was easily and quickly noticed by other farmers and much good followed. Mr. Jackson also outlined and gave details with regard to the Potato Growing and Vegetable Gardening competitions conducted in the counties of Carleton and Russell and stated that as a result of these competitions, the farmers of these counties are following more up-to-date practices in potato growing and increased yields are the result. Similarly, as a result

of the vegetable gardening competition, the farm garden was now looked upon as an essential adjunct to the farm.

Mr. G. A. Putnam, Superintendent of Institutes, Toronto, dealt with the subject of Farmers' Clubs and County Boards of Agriculture, outlining plans under consideration for the present year. These included many demonstrations along agricultural lines as well as demonstrations in the home canning of vegetables and fruits.

In dealing with the subject of Farmers' Week, Mr. H. A. Dorrance, District Representative for Dufferin county, and the originator of the idea in Ontario, pointed out that in order to make a success of a Farmers' Week, speakers of well-known ability must be secured. Entertainment is also necessary, as is the co-operation of the business men of the town in which the meetings are to be held.

Mr. S. C. Johnston, B.S.A., who is in charge of the moving picture bureau recently instituted by the Ontario Government, outlined the plans and work being undertaken, making the announcement that films would be available by January 1st, 1918, for use at agricultural meetings and short courses. It is the intention of the Ontario Department of Agriculture to place in each District Representative office a moving picture machine which can be used in any part of the county, so that the films available may be used for instructional purposes at meetings and at the regular four to six weeks courses in agriculture.

Mr. R. Schuyler, District Representative for Brant county, in discussing the subject of "Mock Auction Sales" pointed out that in his experience, the greatest success in conducting these sales had resulted from having an expert stock man value one animal before the members of his short course class. This gave the boys a general idea of the valuation

of live stock and more satisfactory work was then done.

Dealing with the subject of "County Grants," Mr. R. S. Duncan announced changes affecting the handling of this annual grant of \$500.

On the last day of the conference a visit was made to the Agricultural School and Farm for Eastern Ontario at Kemptville, Ontario. The feature of this day was a tractor demonstration, during which the operations of ploughing, rolling, harrowing, hauling

a hay wagon with hay loader attached and in operation, and that of hauling a manure spreader over the ploughed ground, were performed.

The outstanding feature of these annual conferences is the fact that the men engaged in the work hear and learn of each other's successes and efforts, difficulties experienced in different counties are made apparent, and, in many instances, solutions are found in the successful efforts followed in other counties.

MANITOBA

CROP REPORT FOR THE FIRST HALF OF THE YEAR

ACCORDING to the crop report issued by the Provincial Department of Agriculture covering the first six months of the year, the total area of the province under grain crops was 6,502,197

acres and the total area under all crops 6,813,690; an increase over 1916 in the first instance of 200,318 acres and in the second of 230,303 acres. The different figures for 1916 and 1917 are as follows:—

ACRES UNDER CROPS

	1916	1917	Increase
Grain...	6,301,879	6,502,197	200,318
Potatoes	62,581	66,084	3,503
Roots*	18,561	16,582	
Fodder crops.....	200,366	228,827	28,461

*In roots there is a decrease of 1,979 acres.

NUMBER OF LIVE STOCK

The number of live stock for five years is given as follows:—

YEAR	Horses	Cattle	Sheep	Pigs
1913	300,753	456,936	52,142	248,254
1914	325,207	498,040	75,100	325,416
1915	329,994	631,005	76,577	286,433
1916	341,496	665,686	89,475	261,774
1917	419,006	669,082	146,776	375,597

Foals, calves, lambs and young pigs are included in the 1917 totals. increases in 1917 over 1916, of horses, 77,510; of cattle 3,396; of sheep 57,301 and of pigs 113,823.

FARM HELP

The following gives the farm help and average wages paid per month this year:—

Males Employed During Winter	Average Wages Winter	Males Employed During Seeding	Average Wages Seeding	Females Hired Spring	Average Wage
8,689	\$21.00	16,915	\$45.40	4,919	\$19.00

PLOUGHING MATCHES AND DEMONSTRATIONS

BY S. T. NEWTON, B.S.A., SUPERINTENDENT, EXTENSION SERVICE, DEPARTMENT OF AGRICULTURE

AS a means of promoting sociability and the get-together idea, the ploughing match seems to be in a class by itself, and in the great revival of interest in better methods of agriculture, the ploughing match and the summer-fallow competition are playing a very important part.

So many agricultural societies took up this work for the first time that a series of ploughing demonstrations

such terms as "feering," "sole furrow in and out", etc., were like 'A B C' to the 50 or 60 men who turned out, and the summer-fallows in each district where demonstrations were given bear testimony to the benefit of the instruction. Possibly the most notable discovery made was that owing to wrong adjustments and too much side draft many farmers were wasting from 15 to 30 per cent of their horse or gas power.

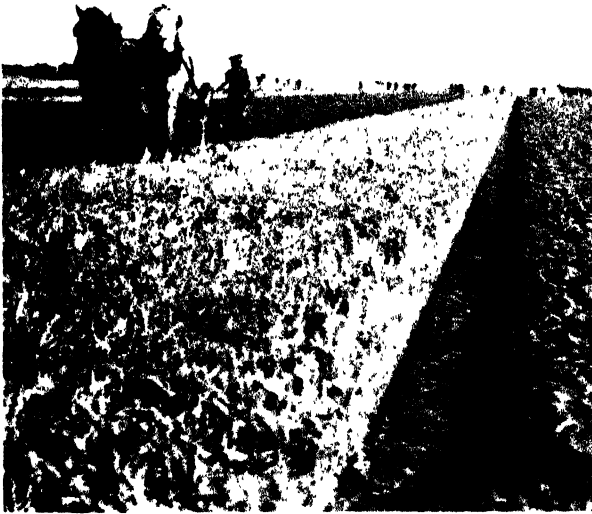
In Manitoba the two-furrow gang plough drawn by four horses is in general use. The horses are hitched in one of three ways, first, tandem; second, four abreast with the off horse in the furrow; and third, four abreast with the off horse on the ploughed land and the second horse in the furrow.

The demonstrations showed that there was the most side draft and consequent loss of power when the off horse was in the furrow, and that generally the best results were obtained when the teams were hitched tandem, and the chief reason that the latter method is not followed entirely is the difficulty of securing experienced help or men capable either of training the horses to

work tandem or to keep them in training.

While the demonstration was in progress for the men, other demonstrations were provided for the ladies in either vegetable canning or home nursing, and the combined attendance ranged from 80 to 200.

In all, demonstrations were held at sixteen places in the province, and served to arouse interest and en-



MR. J. SUTHERLAND, BERESFORD, PROVINCIAL CHAMPION WITH WALKING PLOUGH

were planned and carried out by F. F. Parkinson, himself a winner at many matches in previous years. In the demonstrations careful attention was given to the different hitches, adjustments, etc., and the proper methods to follow in the strike-out, so that all weeds are cut and no ridge is left in evidence at the centre of the "land".

When the demonstration was over,

thusiasm in the matches which followed within a fortnight.

This year 25 matches were held, and while the average number of competitors at each match was eight, yet the number who benefited was

majority having motored in, and autos end to end and four abreast extended for over a mile in front of the farm where the match was being held.

The winners at this match were Thomas Wishart of Portage la Prairie in the gang plough class, and J. Sutherland of Brandon in the class for walking ploughs.

On the following day the small gas tractor match took place, when there were ten competitors and another large crowd of interested spectators. J. A. Brownridge, the runner-up in the gang plough class with horses, was the winner.

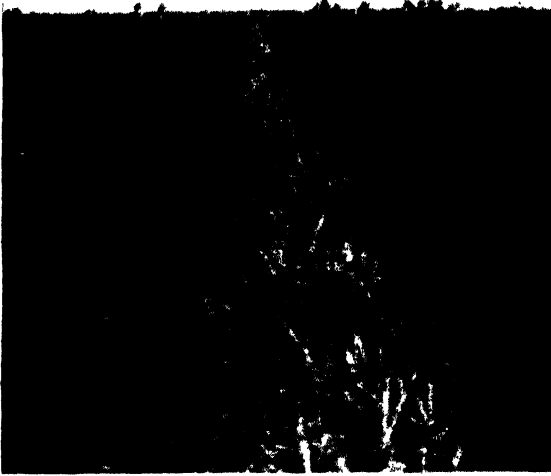
The idea of having the farmers compete in a match of this kind and use their own ploughs was somewhat unique, and proved so successful that it will be continued next year.

Liberal support is given by the provincial Government to this work, the grant being 60 per cent of the amount actually paid out in cash prizes. Besides this, many medals, cups and other trophies are donated by private

many times that number. for the interest was maintained throughout, and every furrow turned was critically examined.

The ploughing match season each year culminates in the big provincial match at Portage la Prairie, when the winners from all the smaller matches meet to compete for provincial honours. This year the match was held on June 27th, and fully 3,000 people were present from all parts of the province, the great

individuals who know that without good ploughing effective cultivation is not possible.



FINISH MADE BY MR. H. WISHART, WHO WAS AWARDED SPECIAL PRIZE FOR BEST FINISH IN THE GANG PLOUGH CLASSES



MR. T. WISHART, PROVINCIAL CHAMPION WITH GANG PLOUGH

SUMMER-FALLOW COMPETITIONS

BY S. T. NEWTON, B.S.A., SUPERINTENDENT, EXTENSION SERVICE

AT the last session of the Manitoba Legislature provision was made in the Agricultural Societies Act for summer-fallow competitions, the idea being that the summerfallow competitions could be preceded by the ploughing match and followed by the standing crop competitions, and these again would give place to the seed grain fairs.

The Department of Agriculture gives a grant of 60 per cent of the amount actually paid out in cash prizes. Besides this, they supply an efficient judge or referee to co-operate with the two local judges in placing the awards.

The summer-fallows are inspected two or three times during the year. During the last inspection an automobile visit is made by all the people in the community to each of the summer-fallows in the competition. At this time, other methods of farming than the summer-fallow are observed, but, in general, most attention will be paid to the summer-fallows.

In the evening, lectures on cultivation will be given by members of the agricultural college staff.

This being the first year that this competition has formed a part of agricultural society work, only about 15 per cent of the societies are taking advantage of it, but over 60 per cent have expressed a desire to include

this as one of their activities during the coming year.

A bulletin on summer-fallow was prepared early in the season. Following are the regulations governing the Virden Agricultural Society competition which gives a good idea of the plan usually followed:—

VIRDEN SOCIETY COMPETITION

To encourage and promote well cared for summer-fallow, the Virden Agricultural Society have decided to put on a contest known as "The Summer-Fallow Competition."

One hundred and forty dollars (\$140.00) will be divided in the following prizes:

For the best summer-fallow: 1st, \$50; 2nd, \$35; 3rd, \$25; 4th, \$15; 5th, \$10; 6th, \$5.

The following rules will govern the competition, viz.:

1. Competitor must be a member of the Virden Agricultural Society.
2. Entire summer-fallow will be judged on the farm the competitor is living on.
3. No farm will be allowed to compete, with less than ten acres in summer-fallow.
4. Every competitor must give a statement of his method of ploughing and cultivation. The first three prize-winners' statements will be published.
5. Summer-fallow will be inspected three times; first, about July 10th; second, August 10th; third, October 10th.
6. Ploughing to be completed by July 15th unless the competitor is reploughing his summer-fallow.

Open to any farmer within a radius of twenty miles of Virden.

Entries to be in by Saturday, July 7th.

SASKATCHEWAN

JUNIOR AGRICULTURAL SERVICE LEAGUE

WITH the object of further encouraging the children of the province to save the wheat, the Junior Agricultural Service League of Saskatchewan is being organized. The assistance of the children this year in connection with the killing of thousands of gophers has done a great deal towards protecting the grain, and for this year the work of the new organization will be concentrated on the destruction of the gopher. It is expected that next year something may be done to assist in the control of weeds.

The Weeds and Seed Branch of the Department of Agriculture has announced that for service rendered the following system of promotion is planned; membership class, over 50 points; third rank, over 200 points; second rank, over 500 points; first rank, over 1,000 points; district bronze medal; provincial silver medal.

The regulations are as follows:

1. Two points are allowed for gophers destroyed up to and including Gopher Day, May 1, and one point after May 1.
2. Children 18 years old and under are eligible to become members of the Junior Agricultural Service League.
3. In order to become members, boys and girls must present gopher tails to the school teacher, who will report to the Department of Agriculture on the blank form supplied. Certificates will be issued by the Department giving the rank of each child. Buttons may also be issued later for each class and rank.
4. Teachers shall accept gopher tails

only as evidence that gophers are destroyed. As soon as the gopher tails are counted by the teachers they must be destroyed. If the municipality pays a bounty the tails may be kept and sent direct to the municipal office.

5. The province will remain divided into the same thirty-six divisions as were arranged for the gopher competition in the spring. Division thirty-seven will be included in thirty-six.

6. A bronze medal will be awarded to the boy or girl getting the most points for the whole year in each division. A silver medal will be given to the boy or girl with the most points in the whole province.

7. No child who has been awarded a medal in the gopher competition will be eligible for another medal this year.

8. The children of the 980 schools that reported on May 1 in connection with the competition will be allowed two points for each gopher destroyed, and all those who destroyed more than 25 will be considered members of the Junior Agricultural Service League, and their standing will be sent to them as soon as possible.

When a child has destroyed sufficient gophers to warrant transference to another class, the teacher will report on a blank form which will be sent to all schools entering.

The various municipalities are taking a keen interest in any organization having as its object the destruction of the gopher, and it is confidently expected that the Junior Agricultural Service League will soon become a powerful factor in the war declared by municipalities and the provincial Department of Agriculture on the gopher.

PART III

Rural Science

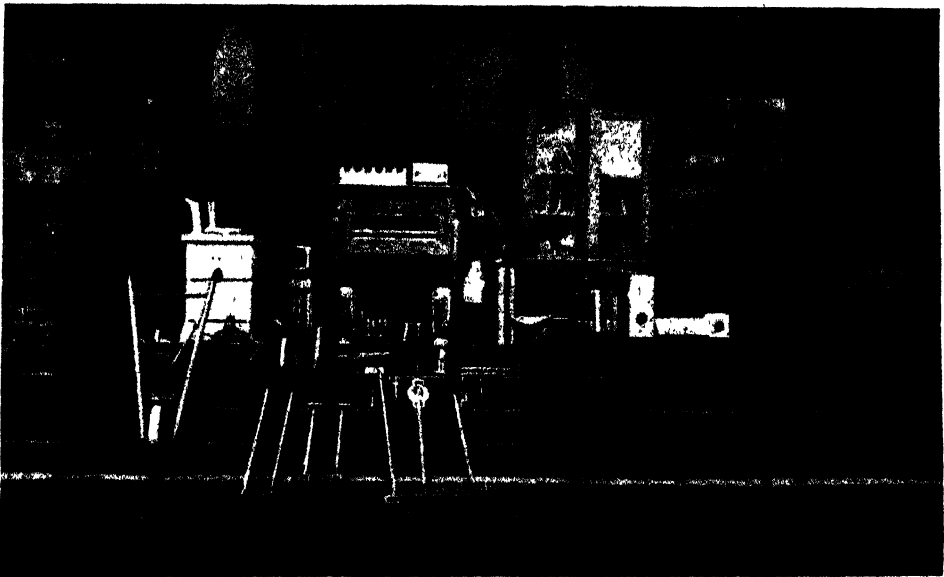
AGRICULTURAL EQUIPMENT IN PUBLIC SCHOOLS

PRINCE EDWARD ISLAND

BY J. E. McLARTY, B.S.A., RURAL SCIENCE DEPARTMENT

THE need for the practical in education is being felt by all connected with educational institutions. The training of the head, the hand, the heart, and the body is necessary to develop that

To properly carry out this practical work the following equipment is necessary:—scales, measuring tape, standard measures (pint, quart and peck); seed testers; samples of grains, plants and weed seeds; small col-



AGRICULTURAL EQUIPMENT IN ONE OF THE SCHOOLS OF PRINCE EDWARD ISLAND

type of citizen which our country demands.

The advent of agricultural education as a part of our public school course calls for much of the practical work and, as such, demands considerable equipment.

lection of native insects; alcohol lamp, test tubes and a few re-agents; milk-testing apparatus, thermometers, and lactometers; egg-candling boxes (supplied by Dominion Department of Agriculture); soil tubes and sampling auger; gardening tools, such as digg-

ing forks, hoes, rakes, spade, wheelbarrow, lawn mower, sprayer and pruning tools. The library should contain suitable agricultural reference books together with some leading periodicals and departmental bulletins and reports.

So far as equipment has been supplied for agricultural instruction in the schools of this province the funds

have been taken from the annual grant to the province under THE AGRICULTURAL INSTRUCTION ACT. The equipment has been selected principally by the teacher in charge upon the recommendation of the Department of Education. Suitable cupboards are provided for their care.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

THE teaching of agriculture in the public schools by the routine recitation and language method has proven with us to be of little practical value. Where the school garden is used as an actual laboratory for demonstrating scientific principles worked upon experimentally in the class-room, the subject becomes a live and interesting one related to the activities of the community and giving results that may be compared with those being obtained by the agriculturist. The work taken up in this way is educational. At the same time it gives a favourable incline of thought and action toward many vocational problems.

To secure the best results apparatus, both in the school room and in connection with the garden, is absolutely necessary. The interested successful teacher will be from time to time adding to the supply. Very much of this may be of an inexpensive character. Some of it may be made by the pupils and in this way a personal interest may be attached to its successful use. The age, size and attainments of the pupils enter into the question of quantity and nature of the apparatus to be used.

Following is a list of such material as may be needed. It might be considerably lengthened. Speaking generally, most of what is named is necessary in all schools if satisfactory work is to be done:

INDOOR APPARATUS

Outfits to be used by pupils in chemistry and physics classes.

The necessary chemicals for soil, plant and insect study.

Thermometer, magnifiers, hand lenses, tweezers, scissors, knives, and in large schools, microscopes.

Agricultural charts, cuts of types of domestic animals.

A library containing reference books on agriculture and nature study subjects, year books, reports, bulletins, pamphlets, circulars and a standard agricultural magazine.

Babcock tester in schools in dairy sections.

Sets of weights and measures such as those in ordinary commercial use.

Balance with metric weights (sufficient in number to allow one for every two pupils in a class).

Samples of grain (in sheaf and threshed) collection to be made every fall for winter use.

Clay pots and boxes for seed testing, seed selection and germination.

Large bottle of mixed seeds of the kinds used in gardens and on farms.

Large bottle of mixed weed seeds, such as those often found in the province adulterating economic seed for sale.

A good sized cabinet in which to keep safely chemicals, apparatus, collections, etc., when not in use.

OUTDOOR APPARATUS

A good assortment of garden tools, garden line, measuring tape, stakes and labels, wheelbarrow, hand cultivator, watering can.

Knives for pruning, grafting and budding.

Cold frames, flats.

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF AGRICULTURAL CLASSES, DEPARTMENT OF EDUCATION

IN order that the teaching of agriculture may be effective, suitable equipment must be provided with a view to making the work as practical as possible. To meet the needs of the different localities which differ in the kind of agriculture carried on, the teacher selects the material aiming to provide that which will be best adapted to the local needs. The board of trustees pay for the equipment but the money is refunded in full up to a certain maximum.

The store room accommodation for such equipment is not as yet all that could be desired, but improvement in this regard is rapidly being made.

The following list of apparatus is recommended as suitable for elementary classes in agriculture and is intended to be suggestive:

GENERAL

Three small glass funnels.
One-half dozen glass tumblers.
One-half dozen glass fruit jars (sealers).
One dozen large test tubes (1 in. by 6 in.).
Measuring cylinder (graduate 100 c.c.).
Hydrometer, Baumé (for heavy liquids).
Hydrometer jar.
Spirit lamp (with wood alcohol).
Thermometer, chemical, both C and F.
Small bottle of hydrochloric acid.
Small bottle of iodine (in K I).
Two litmus pads.
The following, dry, in large-mouthed, cork-stoppered bottles:—
Sodium nitrate, calcium phosphate, potassium, chloride (or sulphate), copper

sulphate, washing soda, baking soda, starch, lime, sulphur.
Filter paper.
Soup plates and saucers, a dozen each.
Flower pots, 3 dozen 4 in.
Flats (boxes for planting seed).
Apple box to demonstrate packing.
Surveyor's chain.
Rain gauge.
Garden tools as may be needed.

SPECIAL

For special purposes, selections from the following may be made:

For Poultry—

Model of feed hopper.
Trap nest.
Model of hen or chicken coop.
Incubator.

For Bee-keeping—

Standard Langstroth hive, complete.
Smoker.
Colony of bees in 10-frame hive.

For Field Crops—

Set of grain measures.
Machine for treating grain for smut.
Samples of grains—wheat, rye, barley, buckwheat, rice in the hull, oats, etc.
Fertilizers.
Weed seeds.

Horticulture—

Pruning and grafting tools.
Hand-spraying outfit.
Hot bed (may be built permanently).
Cold frame.
Combined wheel cultivator and seeder.

For Dairying—

Lactometer.
Babcock milk tester.
Milk scales.
Milk pail (modern).
Butter utensils, for illustration.

SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

BELOW is given a statement of the equipment used in the public school at Indian Head. It was selected by the principal and purchased by the board of trustees. The staff of the school is held res-

ponsible for its care:

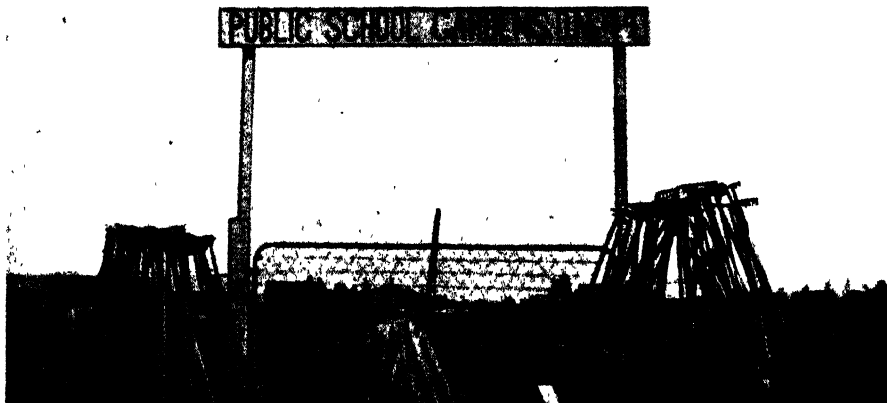
(A) EQUIPMENT OF THE CLASS ROOM

Two spirit lamps; 12 test tubes; 1 evaporating dish; 100 vials for collections of soils, seeds, minerals, etc.; chemicals, such as, acids, iodine, Fehling's solution; dishes, plates, saucers, etc.

(B) EQUIPMENT FOR GARDEN

Fifty hoes; 50 rakes; 50 lines 4' 6"; 375 N.E. stakes, 13" long x 1" x 1½", painted and numbered; 1 tape line marked on one side 4' 6" (the width of plots), the other side 5' 6" (the length of plots)—about 150' long; 1,125 stakes painted but not numbered; 6 window boxes, 29" x 6" x 6"; 50 narrow boards, for pressing seeds after planting.

katchewan are not so well equipped as the school at Indian Head, but the teachers are encouraged to conduct experimental and practical work in the class room and the garden by using the simplest apparatus possible. A spirit lamp; some glass tubing; a balance; a few test tubes, and some



THE "HEAVY ARTILLERY" OF THE PUBLIC SCHOOLS GREATER PRODUCTION CAMPAIGN

This equipment is stenciled "P.S." and stored in a place prepared in the basement. The pupils can reach it as they pass out through the door to the garden. The teachers are required to see that all equipment is replaced in order.

(c) Agricultural books and periodicals in the library.

Many of the rural schools of Sas-

re-agents, supplemented by articles brought from the homes of the pupils, such as tumblers, plates, saucers, etc., should be sufficient for the requirements of the average rural school. Pupils can usually bring their own gardening tools.



PUPILS AND GARDEN EQUIPMENT AT THE PUBLIC SCHOOL GARDENS, INDIAN HEAD, SASK.

ALBERTA

AS time goes by more and more attention is being given in Alberta elementary schools to instruction of all that appertains to agriculture and gardening. A bulletin of 125 pages, issued by the Department of Education, goes into the matter very thoroughly. Speaking of school garden equipment the outlay for this purpose need not be very large. The tools of course that are absolutely necessary are a hoe, rake, digging fork and spade. There are special tools that are required for special purposes and there are a number of implements that it is always well to have handy. There is no objection to pupils bringing their own tools from home, but for obvious reasons it is preferable that such things should be the property of the school. It is considered that in a school with thirty pupils a teacher will be able to get along nicely with eight to twelve hoes, eight to twelve rakes, four digging forks and two spades. Marking stakes for the corners of the beds and stakes for labelling are a necessity. If these are painted white, and are kept white, they not only add to the attractiveness of the garden in neatness, but they lend themselves better to distinctiveness of labelling.

The following is a list of the articles for school garden equipment that are officially recommended:

1. A hoe and a rake for every two or three pupils—some small, some large, according to the age or ability of the pupils in attendance.
2. A digging fork for every six or eight pupils—some with short handles.
3. A spade for every eight pupils—some with short handles.
4. Several transplanting trowels—four or six.
5. Good measuring tape.

6. Supply of stout cord.
7. One to two sprinkling cans, preferably one small and one larger one.
8. A wheel barrow.
9. Two large mallets for hammering pegs.
10. A lawn mower if lawns form part of the plan for the school grounds.

It will be found to be an excellent plan to provide also a garden work bench, preferably a double bench at which two pupils can work at once, with a set of bench tools such as the following:

1. Work bench and two or, preferably, four vises.
2. Two handsaws, one a rip saw and the other a cross-cut saw.
3. A good jack plane.
4. A hammer.
5. A mallet.
6. A file.
7. A hatchet, a small axe.
8. A brace and set of bits.
9. A pair of cutting pliers.
10. A try-square.
11. A two-foot steel square.
12. A monkey wrench.
13. An oil can, half pint size suitable.
14. An oil stone.

It is important, both from an educational and economical point of view, that pupils should be trained to feel responsible for the care and cleanliness of the tools. Everything should be done to prevent rusting, for there is nothing so wastefully destructive as rust. For this purpose a perfectly dry tool room or shed is required. The tools should be numbered and placed in racks, care being observed to return them in exactly the same order and condition as when taken out. An important part played in the equipment of the garden is the planning, and for this purpose a few of the articles used in elementary landscape gardening could advantageously be secured.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

ALTHOUGH great advances have been made in the last twenty years in the matter of securing modern appliances for use in the school-room, there is still much to be done. Maps, books and chalk seem to many school boards to be sufficient for the teacher's use in any and all of the subjects of the curriculum. Equipment and supplies for carrying on even the simplest possible course of instruction in nature study and elementary agriculture are usually rather difficult to get, as very few school trustees understand the work or know what is required in teaching it. Under these circumstances it is necessary that special inducements be offered to school boards in order to have them provide the necessary equipment for teaching elementary agriculture. This can best be done by a system of annual grants towards the expenditures incurred by the board for this purpose.

In British Columbia the work centres around the school or home garden. A certain maximum grant is allowed by the Department to reimburse the board for expenditures made during the year in carrying on a programme of work. An official circular dealing with this question reads as follows:

"Authorized expenditures on account of rural science and school gardening include such items as rental of additional land for school-gardening purposes; fencing and protection of school gardens; school-garden tools and equipment; hooks, racks, etc., for storing garden tools; hot-beds and cold-frames; garden hose and sprinklers; seeds and seed containers; fertilizers; material for collections of plants, seeds and insects; nature-study apparatus, including weather-recording instruments; special rural-science note-books; reference books on rural science for use of teachers and pupils; and necessary hired help in cultivating the school garden or in caring for it during the summer holidays."

The secretary of the school board submits to the Department a state-

ment of all such expenditures at the close of the year, and on this statement and the classification of the school garden operated the grant to the board is determined.

Agricultural equipment may be regarded as coming under two heads, (1) out-door or garden equipment, (2) in-door or class-room equipment.

1. School-garden equipment recommended as a minimum for an ungraded school of from 25 to 30 pupils —

- 1 doz. 10-tooth, steel, straight-toothed garden rakes with handles 4 ft. 4 in. long.
 - ½ " boys' garden hoes, 5 ½ inch blade, solid neck.
 - ½ " girls' garden hoes, 4 ½ inch blade, solid neck.
 - ½ " light, D-handled spades.
 - ½ " transplanting trowels.
 - 1 " hand weeders (claw or bent steel).
 - 2 push hoes (for mulching plots and levelling paths).
 - 1 light digging fork (D-handled potato fork).
 - 1 light D-handled flat, steel shovel.
 - 1 100-foot garden line and iron reel.
 - 1 tape line (English and metric readings, if possible).
 - 2 watering cans, 2-gallon.
 - 1 galvanized iron pail.
 - 4 pint cups, galvanized or agate.
- Material for plot pickets and garden labels, white and black paint and brushes, and a few handy tools, such as hammer or hatchet, block-plane, mallet and 1"-chisel, light hand-saw, file, nails, etc.

As soon as possible the above list should be supplemented by the addition of the following:—

- 1 wheel-barrow.
 - 2 soil screens, ¼ and 1/12-inch mesh.
 - 1 lawn-mower.
 - 1 bucket spray-pump.
 - 1 combination vice and anvil.
 - 1 wheel-hoe and seed drill (in large schools only, with at least ½ acre under cultivation).
2. Class-room equipment.
- Reference collection of weeds and weed-seeds, poisonous plants of the district and, where possible, common insects of the most important orders.
- Materials for making spray mixtures and grafting wax.

Wide-mouth bottles for holding garden seeds: $\frac{1}{2}$ doz. 12 oz., 1 doz. 6 oz., and 1 doz. $\frac{1}{2}$ oz.; $\frac{1}{2}$ doz. quart jam jars for bulky seeds or for stock jars (small tin boxes with close-fitting lids will do as well). All containers must be mouse-proof.

1 doz. plain soup plates (can be used for seed study, as germinating dishes and for many other things).

1 deep dish—tin or graniteware, which can be used for collecting gases over water.

Glass tubing (2 or 3 lb., $\frac{3}{16}$ inside).

1 yard rubber tubing, $\frac{1}{4}$ " outside measurement.

1 alcohol lamp and iron stand.

1 doz. test tubes, 6" x $\frac{3}{4}$ ".

$\frac{1}{2}$ doz. beakers, 200 c.c. and 400 c.c.

4 glass tubes, 18 in. x 1 in. (soil tubes).

1 set of measures—pint, quart and gallon.

1 set trip scales with weights up to 4 lb.

1 doz. shoe-knives with broad blades for root-grafting, etc.

1 grafting chisel.

Litmus and filter paper.

1 4" glass funnel.

1 graduated cylinder, English and metric, 100 c.c.

2 dairy thermometers or chemical thermometers.

1 barometer.

1 rain gauge.

1 glass cutter.

A few rubber corks, 1-hole and 2-hole, to fit 6 oz. wide-mouth bottles.

1 thistle tube.

2 glass flasks, 4 oz.

Small quantities of a few chemicals, such as iodine solution, Fehling's solution, chlorate of potash, manganese dioxide, zinc clippings, sulphuric acid, hydrochloric acid, nitrate of potash, nitrate of soda, copper sulphate, lime water, extract of rennet and methylated spirits.

A school cabinet with plenty of shelf space and locked doors, where all such supplies and equipment can be safely stored.

The out-door equipment as given above will cost in the neighbourhood of \$50, and the class-room list, including the cabinet, about the same amount. It is impossible to estimate the value to the children in our schools of the work which a competent and well-trained teacher can do, making use of such a set of appliances as is herein enumerated.

Agricultural nature study cannot properly be taught without a certain

amount of equipment. Resourceful teachers can improvise many simple things, but there is a limit to the patience as well as to the resourcefulness of even our best teachers. It is worth more than \$100 every year to any community to have such a really simple and inexpensive equipment as the above for daily use in the study of elementary agriculture. If we are in earnest in this matter of teaching agriculture in these schools, it is high time that we make some attempt to equip our schools and select teachers with that end in view.

STORE-ROOM FOR TOOLS

Most of the schools in British Columbia are provided with commodious basements with play-rooms as well as furnace and fuel rooms. It is customary to board off a small room 8 or 10 ft. square in such a basement for storing garden tools and equipment. Strong hooks and racks are fastened to the walls and some shelving put in. In other cases an addition is built to the woodshed and in this small outside room the garden equipment is stored. The proper care of garden tools should be insisted on from the start.

A garden class-room with facilities for storing tools is best of all. It is placed in or beside the garden and can be used for various things for which the ordinary school-room is unsuitable. It is fitted up with a work-bench at one end and soil benches 24 to 30 inches wide, along both sides. It should be not less than 12 ft. x 20 ft. and for a large class a few feet longer. It should have good light, and be high enough to allow for storing hot-bed sash, etc., overhead. In such a garden house classes in nature study and agriculture can be conducted with materials such as soils, grains, weeds, vegetables, etc., which cannot so well be carried on in the regular school-room. It is sometimes possible to fit up the "old school" as an ideal garden and agricultural class-room.

SCHOLARSHIPS FOR HOUSEHOLD SCIENCE

NEW BRUNSWICK

BY MISS HAZEL E. WINTER, SUPERVISOR OF WOMEN'S INSTITUTES

IT has been the custom in this province to pay the railroad fare of women attending Macdonald College, Macdonald Institute and

the Nova Scotia Agricultural College to take up the Household Science course.

SASKATCHEWAN

IN view of the fact that there is not in Saskatchewan a school of household science at which farmers' daughters may acquire a proper training to fit them for their life work, arrangements were made in 1909 to provide scholarships to encourage the young women of the province to attend such institutions in other parts of the Dominion.

Since this plan was adopted, seventy-three scholarships have been awarded. The courses were taken at the Manitoba Agricultural College, and a smaller number trained at Macdonald Institute at Guelph and Macdonald College at St. Anne de Bellevue, Que. The scholarships and regulations regarding them are as follows:

1. To each student from Saskatchewan passing with first class honours in her first year..... \$ 75.00
(The winner of No. 3 is not eligible to compete for this scholarship).
2. To students from Saskatchewan passing in all subjects of the first year ... 50.00
(Winners of No. 1 and No. 3 are not eligible to compete for this scholarship.)
3. To the student from Saskatchewan standing highest among the students from Saskatchewan in general proficiency in the work of the first year ... 150.00

FOR SECOND YEAR STUDENTS

4. To each student from Saskatchewan graduating with first class honours on completion of the regular two years' course..... 100.00
5. To students from Saskatchewan passing at the end of the second year in all subjects of the regular two years' course..... 75.00
(The winners of No. 4 and No. 6 are not eligible to compete for this scholarship).
6. To students from Saskatchewan standing highest among students from Saskatchewan in general proficiency in the graduating class on completion of the regular two years' course..... 150.00

Any student from Saskatchewan at any of the colleges named herein though otherwise eligible to compete for scholarships Nos. 3 and 6 shall not be awarded one of such scholarships unless there are in her class at least five Saskatchewan students eligible to compete for either of the said scholarships.

Scholarships are not offered for third or fourth year work.

In awarding scholarships the work of the entire college year will be considered.

Scholarships will be awarded and paid as

they fall due upon receipt of reports from the principals of the respective colleges showing the standing of the students from the province.

Students winning scholarships must furnish proof satisfactory to the Minister that they have been *bona fide* residents of the province for at least two years immediately before entering college and that during that time they have spent at least two summers in practical work in a farm home.

BRITISH COLUMBIA

BY W. E. SCOTT, DEPUTY MINISTER OF AGRICULTURE

THIS Department makes an allowance of \$50 a term for any *bona fide* British Columbia woman who wishes to attend any of the agricultural colleges in Canada for the purpose of taking a course in domestic science. There are, of course, two terms in the year, which is the equivalent of a grant of \$100 per annum. This has been in effect for a considerable number of years, but as soon as our provincial university gets properly started, it will be discontinued.

I attach herewith a statement giving the number of women of this province who have taken advantage of this offer for the last few years.

In connection with our women's institutes, short courses and lectures have been given in the past on matters of domestic science, the Department supplying the lecturer or demonstrator. This educational work has undoubtedly been productive of very good results.

PROFESSIONAL COURSES

Two-Year Normal Course:

Miss Frederica Oliver (1911-13).
Miss Mildred E. Ruttan (1916-18).

One-Year Normal Course:

Mrs. Carrie H. Burns (1910-11).

Housekeeper Course (2 Year):

Miss Sibylla Hadwen (1908-10).
Miss Mabel Witmer (1915-17).

NON-PROFESSIONAL COURSES

Associate Course (2 Year):

Miss Margaret H. Davis (1913-15).
Miss Mary Steele (1916-18).

Homemaker Course (1 Year):

Miss Elizabeth B. Lineham (1915-16).
Miss Elma M. Lineham (1915-16).
Miss Mary C. Stevenson (1911-12).
Miss Olive J. Buchan (1910-11).
Miss Edith Beard (1910-11).
Miss Rose Palmer (1907-8).
Miss Elma Bell.

Short Course in Domestic Science (3 Months)

Miss Eva Beard (1911).
Miss Muriel Gibson (1910).
Miss Phyllis Slater (1916).
Miss Olive Wilson (1911).
Miss Emily Bradley (1910).

Short Course in Sewing:

Miss Hattie Thomson (1908).

ONTARIO

AGRICULTURAL TEACHING IN THE PUBLIC AND SEPARATE SCHOOLS

IN 1916, 752 public and separate schools qualified for grants according to the regulations of the Department of Education. Under this scheme one of two plans may be adopted both of which require the teaching of agriculture in class for at least one hour a week throughout the school year. Home gardens or school gardens are also essential. The equipment needed for instruction in agriculture is fully paid for in the form of grants to the boards, providing the money has been spent as indicated in the regulations. These details are given in

Circular 13, 1917, pages 6 and 7.

Reports concerning this work are given in detail in the blank forms supplied by the Department of Education for the purpose. In this way the head office is in close touch with the actual work carried on in the various schools. The inspectors are requested by regulation to pay special attention on the occasion of their regular visits to the teaching of agriculture and to report to the Department on special forms provided. For the special work of inspection an allowance is made—six dollars for each school taught by

a teacher holding a certificate in agriculture and four dollars for each school where classes in agriculture are under the charge of a second-class teacher. The teaching of agriculture is recognized only in Forms III, IV, and V, and in these classes there were in 1916 over 13,000 pupils at a cost of about 75 cents a pupil per year.

AGRICULTURE IN THE HIGH SCHOOLS

Twenty-one secondary schools conducted classes in agriculture in 1916, with about 600 pupils. To promote the teaching of agriculture in the secondary schools, allowances are made to Boards for the purchase of equipment, and to the teacher for conducting the work. The maximum allowance to Boards is \$100 for the lower school course and \$100

for the middle school. In each case there may also be an allowance of \$80 for the lower school and \$80 for the middle school to the teacher on the subject.

NORMAL SCHOOLS

Instruction in agriculture is given in the Normal Schools to meet the needs as far as possible of the inexperienced rural school teacher. The following topics, with some attention to methods of teaching the subject, are taken---dairying, poultry, field crops, horticulture, birds and insects, experimental plots, school gardens, home projects, and care of school grounds.

To procure special equipment for teaching these topics, use is made of the funds supplied by the provisions of THE AGRICULTURAL INSTRUCTION ACT.

MANITOBA

SUMMER COURSE IN AGRICULTURE FOR TEACHERS

THE Manitoba Agricultural College is offering to teachers a three-year course leading to the degree of B.S.A. Teachers holding first-class or second-class professional certificates may complete the first year's work in three summer courses of six weeks each, which will qualify them to enter the fourth year of the regular B.S.A. course. The first year's work is divided into the following nine groups of subjects, and three of these groups will be covered each summer:

OUTLINE OF STUDIES

1. Cattle, Horses, Veterinary Science.
2. Sheep, Swine, An. Chemistry.
3. Dairying, Dairy Bacteriology, Poultry.
4. Soil Bacteriology, Soil Physics, Soil Chemistry, Soil Cultivation, Principles and Methods.
5. Weeds, Cereals, Legumes, Grasses.

6. Vegetables, Fruits, Flowers.
7. Farm Accounts, Farm Management, Rural Economics.
8. Forge Shop, Gas Engines, Cement.
9. Wood Shop, Building Construction, Farm Homestead.

This work is practically the same as that of the first year of the regular winter course.

A teacher holding a first-class professional certificate will be qualified to act as principal of a high school or collegiate institute upon receiving his B.S.A. degree in this course; while a teacher holding second-class professional standing will be qualified to act as assistant teacher in a high school or collegiate.

The present summer course opened on July 3rd, and will continue for six weeks from that date. The number of students attending is six (five men and one woman).

SASKATCHEWAN

EXHIBITION OF SCHOOL GARDEN PRODUCTS

AS evidence of the public interest in school gardening the action of the exhibition boards of the province in providing prizes for school garden products may be cited. A particular example of this is indicated in the arrangements made by the Provincial Exhibition Board whereby provision has been made for a special class in which prizes will be given for the products of school gardens in accordance with the following rules:—

(1) All exhibits must have been grown in a public school garden or plot and cared for by the pupils of the schools making the exhibit.

(2) Not more than one exhibit may be made by any one school.

(3) Entry must be made in the name of the school not later than June 30th, 1917, and the entry must be signed by the teacher of the school at the time the entry

is made. It is unnecessary to state the kind of vegetables to be included in the collection. No entry fee is required.

(4) Each exhibit must consist of a collection of not less than six kinds of vegetables and may be composed of any six of the following kinds and in the quantities stated: 36 pods each of peas and beans; 3 heads each of lettuce, cauliflower, cabbage; 12 each of radish, carrots, beets, turnips, onions, potatoes.

(5) For the purpose of this competition the province has been divided into four sections, viz., south-east, south-west, north-east and north-west. Each division is subdivided into two sections, viz., rural schools and town or city schools; the northern divisions being separated from the southern by the South Saskatchewan and Qu'Appelle rivers; the north-eastern from the north-western by the third meridian and the south-eastern from the south-western by the eastern boundaries of the Regina and Radville inspectorates.

(6) The prizes in each section are:—1st, \$10; 2nd, \$8; 3rd, \$6; 4th, \$5; 5th, \$2.

THE SCHOOL FAIR AND RURAL CITIZENSHIP

BY J. T. M. ANDERSON, M.A., LL.B., INSPECTOR OF SCHOOLS, YORKTON

NO movement in rural districts of the Prairie Provinces is accomplishing more to develop a public spirit in the various peoples than the Union School Fair.

In these provinces, where there is such a large number of "foreign" settlers, educators have been greatly interested in this work, and during the past two or three years remarkable progress has been made. During the year 1916 dozens of successful fall fairs were held in connection with the public schools, and the results tend to indicate that this comparatively new idea in rural education, will form an important factor in the solution of the rural problem.

As a concrete illustration of the

school fair as a social and educative factor in community betterment and rural advancement, a series of fairs held in North-Eastern Saskatchewan during the fall of 1916 may be referred to. Early in the spring prize lists were issued by a central committee and fairs arranged for at fourteen different village centres. The rural schools in the vicinity of each centre were asked to co-operate in preparing exhibits for the fall fair to be held at this centre. Immediately there was aroused a wider interest in rural school life. The school and home gardens were carefully prepared and throughout the year received careful attention. The drawing, sewing, and manual classes

were conducted with a view to producing creditable work for the fair. The children's exercise books were more neatly kept than ever before, and this suddenly increased interest resulted in better and more thorough work in all branches of the public school course. Hand work was emphasized as never before and the work of hand and mind correlated in most encouraging fashion.

A visit to any of the hundred schools participating showed a better and more regular attendance and a better school spirit generally prevailed. In addition to this there was a wide interest on the part of the parents, thus bringing nearer to realization that most desired sympathetic co-operation between the school and the home. The teachers, too, profited from the opportunity afforded of meeting together regularly to discuss arrangements for the fairs, and a live interest in their work was manifested throughout the year. Trustees responded liberally to requests for financial and other assistance and more than ever before these important officials displayed a marked interest in the performance of those duties which too often in the past have been but slightly regarded.

The fairs at the village centres were held on Monday, Tuesday and Wednesday of the last week of September and all the prize-winning exhibits were sent to the town of Y——, where a very large fair was held on Friday and Saturday of the same week. At each village fair from five to thirteen rural schools took part with the result that one hundred schools were represented in the large central exhibition.

On the day of the fair the teachers were in the village early preparatory to unpacking and arranging the exhibits. In many cases the parents provided conveyances to bring in the country children. The rooms of the village school were tastily decorated with flags, mottoes and banners; all branches of school work were repre-

sented. Long tables were laden with choice vegetables grown in home or school gardens. Maps, drawings, specimens of writing, essays and exercise books, testified to work done in the school-room. Hand work of various kinds, including paper-cutting, weaving, basketry, wood-work and modelling formed a most attractive display, while the exhibit of bread, cakes, and pastry was most creditable.

At most of the fairs the older pupils were placed in charge of the exhibits, and readily answered any inquiries on the part of visitors. In this way they were getting a valuable training for after life. At several centres girls from the senior grades served tea, and in this way collected substantial sums for the Canadian Red Cross and Belgian relief funds.

About four o'clock in the afternoon a concert was held, each rural school contributing two or three numbers to the programme. In this way the spirit of co-operation was still further substantially encouraged. Addresses by public men and prominent citizens of the various districts constituted another striking feature of these gatherings, and all who spoke emphasized the fact that "education is training for a happy and useful life".

Eighteen different nationalities were represented in the schools participating in these fairs. At one centre children of Bohemian, Hungarian, Swedish, German, Belgian, and Polish parentage, took part and their parents mingled freely as they proudly examined the work of their respective children; at another fair boys and girls of Ruthenian, Scotch, Welsh, Assyrian and English parents had their work arranged side by side on the long tables. But throughout the whole fair the children used no language but English.

The prize exhibits from each of these fourteen centres were sent to the town of Y——, where a very large union school fair was held. There were over two thousand en-

tries and more than one hundred teachers attended.

The rural problem in our foreign settlements will never be solved until the home and the school become more closely united and work together for mutual improvement. Our idea of "fairs" has too long been confined to exhibits of dairy cattle, thoroughbred horses, fancy dogs, and

horse-races. Let us in future devote more attention to the proper rearing of the youth of the land! Let us have children with strong, well-developed bodies and alert, carefully-trained minds! Let us turn our attention to this great problem of laying a solid foundation for the Canada of the future!

BRITISH COLUMBIA

SCHOOL GARDENING IN THE PROVINCE

DURING the year 1916, school gardening was carried on systematically in one hundred and forty-five different schools by two hundred and twenty-five teachers, and in addition to this, home gardening was carried on in twenty-five schools. The home

gardening work is closely supervised by the teachers, and is reported on in June and in September. Carefully prepared reports are also furnished twice a year by all teachers taking up school gardening. Agricultural nature study has a prominent place in the public schools of the province.

In a statement with regard to "Food Conservation," W. J. Hanna, Food Controller for Canada, said: -There are some measures that are so obviously right that we ask that they be adopted at once, and that the men and women of the Dominion pledge themselves to their observance. They include:

Maximum production; the largest possible production of perishable foodstuffs in order to liberate the storeable foods for transportation; the adoption of war menus; the prevention of food waste; the utilization and creation of organized volunteer bodies to assist the Food Controller in increasing and conserving the food supplies.

The food problem of the Dominion is not measured by the domestic market, but by the needs of the Allied armies and nations. They require tremendous supplies of wheat, meats, fish, cheese, beans, canned and evaporated foods and other commodities. They cannot be rationed unless the Dominion saves such foodstuffs for export. Fruits and vegetables in their seasons should be the country's foods to the greatest possible extent.

Public realization of the true food position is imperative. Food conservation is imperative to win the war.

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

ACTS RELATING TO AGRICULTURE

COLD STORAGE

Cold storage, by reason of the extra necessity for the preservation of perishable articles of food, has in the last few years considerably increased in importance. The legislation directly relating thereto has been neither of an extensive character nor of a lengthy description. The Dominion Parliament has adopted two measures of the kind, one in 1907, entitled "The Cold Storage Act," and another in 1914 entitled "The Cold Storage Warehouse Act." These Acts are administered by the Dairy and Cold Storage Commissioner. Nova Scotia and New Brunswick of the provinces alone have measures on the statute books of the nature referred to.

THE DOMINION ACTS

"An Act to encourage the establishment of cold storage warehouses for the preservation of perishable food products"* is the descriptive or long title of the Dominion Cold Storage Act. It repealed "an Act respecting Cold Storage on Steamships from Canada to the United Kingdom and in certain cities in Canada", passed in 1897, and consists of ten sections. The Governor in Council is authorized by the Act to enter into contracts for the payment of subsidies on public cold storage warehouses equipped with mechanical refrigeration, and suitable for the preservation of any food product up to thirty per cent of the amount expended on the construction and equipment thereof. Payment is made as follows: fifteen per cent at completion, seven per cent at the end of the first year, four per cent at the end of the second year and two per cent at the end of each of the two succeeding years. Upon the Minister of Agriculture rests the responsibility of deciding whether the grants have been duly earned or not, and he is given absolute power of

inspection and supervision over the operation and maintenance. An applicant for the subsidy must not only submit a full description of the proposal, but must also show that there is need for public cold storage in the locality where it is proposed to erect a warehouse. The rates and tolls must be approved by the Governor in Council, who also is empowered to make such regulations as are advisable, by the violation of any of which a penalty not exceeding \$50 is incurred.

Some account of the working of "An Act to regulate Cold Storage Warehouses", assented to June 12th, 1914, was given in THE AGRICULTURAL GAZETTE, Vol. II, page 1049. The Act describes the meaning of cold storage as the storing of articles of food at or below a temperature of forty degrees Fahrenheit, and a warehouse, as referred to in the Act, as an establishment in connection with which refrigerating machinery, or ice or salt, is used for the maintenance of that temperature and in which articles of food are stored for periods not exceeding twenty-one days. Regulations to be made by the Governor in Council are to provide for licensing, inspection, reports showing the quantities of food in storage, limiting the period of storage, and for labelling or marking of food products when they go in and when taken out. Owners, managers, storemen and other employees are enjoined to offer every facility for the performance of their duty

*Before this law came into force, the larger centres had been provided with cold storage facilities, so that the development of the industry, under the stimulus given by this legislation, and the subventions which it provides for, has been largely along the line of the erection of comparatively small local warehouses situated in the producing centres of Eastern Canada. In this way, storage facilities are provided as near as possible to the point of production and the goods are placed in cold storage with the least possible loss of time or chance for deterioration.

to a fine not exceeding two hundred dollars or to imprisonment for six months or to both fine and imprisonment.

THE NOVA SCOTIA ACT

The Nova Scotia Act was passed in 1897 and is embodied in the Revised Statutes of the province of 1900. It provides that the Lieutenant-Governor in Council may grant aid to a properly equipped cold storage establishment by guaranteeing the annual interest upon a sum of money for a period of years, or the annual dividend upon shares of the capital stock of a company, or by an annual subvention. The order-in-council authorizing such aid may contain provisions for representation upon the board of directors, for fixing the rates of storage, for inspection of the books and accounts and such other provisions as may be deemed advisable. The order-in-council may embody, or be accompanied by, a form of contract. The aid is not to exceed \$2,000 in any one year and not to be granted for any period exceeding three years.

THE NEW BRUNSWICK ACT

"Respecting Aid towards providing cold storage for agricultural and other Products" is the descriptive title of the New Brunswick Act. Its provisions are much the same as those of the Nova Scotia Act, but are given at greater length. They set forth that the Lieutenant-Governor in Council may grant aid by guaranteeing

interest or dividends, or by an annual subvention, towards the erection and equipment of a cold air storage depot in the city of St. John and auxiliary depots as circumstances may justify in other suitable localities. As a condition of this aid it is provided that the Lieutenant-Governor in Council shall have the making of the rates to be charged for storage and the making of regulations for inspection and general supervision. The aid in the aggregate must not impose upon the province a liability in excess of \$7,500 per year and must not extend for a longer term than seven years. Special provision is made in the Act for guaranteeing the bonds of the New Brunswick Cold Storage Company, Limited, to the extent of \$60,000, but not in excess of 75 per cent of the actual cost of the buildings and plant. The rate of interest is set at 4 per cent and the bonds are payable in 40 years. Insurance must be maintained in the usual way, or, by an amendment passed in 1915, the Lieutenant-Governor in Council can accept the guarantee of the Canadian Pacific Railway Company in lieu of such insurance. Reports have to be filed semi-annually and the Lieutenant-Governor in Council has the approval of the salaries paid. The title to the lands, buildings and plant is vested in the Crown until the bonds are redeemed. The Provincial Secretary and Commissioner of Agriculture for the province are *ex officio* members of the board of directors.

THE COLLEGE AND RURAL LEADERSHIP

FROM ANNUAL REPORT, 1916, OF PROF. J. B. REYNOLDS, PRESIDENT, MANITOBA AGRICULTURAL COLLEGE

IT is a perfectly obvious fact that if the influence of the college in the province were measured by its ability to turn out two or three or four hundred good farmers and good housekeepers each year, who after leaving the college should retire at once into private life, and turn the knowledge and skill they have gained at the college into private advantage and profit, then that influence so measured would not justify its existence. The college could not thus make an adequate return to the province for the money that it costs to operate it.

The whole province supports the agricultural college, and the whole province should gain from the work of the college—else it falls short, and fails. What have we a right to expect from young men and young women who have spent one, two or more years at the college studying the problems of farm and home and community? A fair measure of success in managing their own affairs? Yes, and something more

than that. We expect public spirit, active citizenship, an enthusiasm in all things that make for a better community life.

I have seen the desire for private business diminish in young men who have spent some years at college. I have seen the desire to "farm on their own account" fade away, and be replaced by another desire, the desire for public service. And it is in public service, whether professional or amateur, that the agricultural college graduate can repay the obligation he owes to the province for the education received.

by inspectors or other officers who may be appointed under the Act. The measure does not apply to refrigerated rooms in connection with hotels, restaurants, dining-car services, retail shops, private houses, manufacturing houses other than packing houses, refrigerator cars or steamships with refrigerated space. Contravention of any provision of the Act brings liability

The agricultural college idea is the idea of a wholesome and satisfactory country life, and we try to inspire our students with that idea. Those who come adequately under the influence of the college do, I believe, accept that idea, and whether they are farmers, home-makers, teachers or preachers, they do, more or less, try to make the gospel of rural life prevail.

In 1916 the college taught 358 students in long courses and 365 in short courses. Who were these in the short courses? Chiefly, two classes of students—public school teachers and rural ministers. These two classes of citizens may exert a tremendous influence on country life. They may, directly and indirectly, in season and out of season, help to make country work a greater material success, by understanding some of the problems in country work, and, by hint and instruction and leading, bring about better farming. They may do more. If these teachers and preachers have a sense of rural values, of the interests and attractions possible to country life at its best, they, as rural leaders, may cultivate in children and grown people that sense of rural values, and help to make that life interesting and attractive.

That purpose is at the foundation of the nature study and agriculture and home economics and rural sociology which the rural teachers and rural ministers and ministers' wives learned, if ever so hurriedly, at the agricultural college.

Possibly one hundred and fifty of these teachers and ministers went from the college to the country. We cannot hope that all of these comprehended fully the agricultural college idea. But we know that many of them did, and we know that many have become effective agents in taking the college to the country.

EDUCATION FOR COUNTRY LIFE

There has been no serious, well-considered attempt yet made in this country to turn the minds of children, by the education received in the schools, towards country life. The suggestions and implications and ideals of the school books do yet, for the most part, point towards the town. We need some new text-books, if only an arithmetic, that contains some probable farm problems or a history that starts right in the community where the school is situated, or a commercial geography that enables the children to discover how important in the commercial affairs of the world are the products grown on their own farms. And, to make adequate use of such text-books, we need secondary schools that will train the future teachers in these rural ways of thinking, and that

will surround them with a real rural atmosphere.

To solve the problem of education for country life, it is necessary to "ruralize" the teachers who are to teach in the rural schools. These teachers must have a knowledge of the actual conditions and problems of the farm, a love for country life, and a faith in its material and social possibilities. How can we get such teachers? We may not be able to get them, enough of them. But one thing is sure: we have not yet gone the right way to get them. The teachers, for the most part, have been trained in secondary schools situated in large towns and cities. The teachers engaged in the secondary schools have in turn been taught in the university. There is little chance for the rural idea to enter there, except by accident of taste and disposition.

I have suggested to the Department of Education, and the Department has favourably considered the suggestion, that the principals of some of our secondary schools should be graduates of the Manitoba Agricultural College. For such principals, the Department of Education guarantees the academic standing, and the Agricultural College guarantees the standing in agricultural science. With the principal of the school proficient in agricultural science, and interested in agriculture and country life, there will be a good chance of giving the education in the school where the future rural teacher spends three years, some such turn as Mr. Cummings has given it in his school at Teulon.

Already, in accord with this policy, we have at the college three men entered on a course fitting them to direct agricultural teaching in the secondary schools.

The work done by the Normal schools of this province, in fitting the teachers so far as possible for country work, is deserving of all praise. I know more particularly the schools at Brandon and Winnipeg, and I know that the principals and the teachers there realize the importance of this work, and are doing their best to accomplish it. But six months at the Normal school, even if a month is added at the agricultural college, cannot supply the deficiency of the secondary or high school course. The solution of the problem is the ruralized secondary school.

The Minister of Education and the Deputy Minister have shown their determination that this shall be done, and they are generously allowing the agricultural college to co-operate. The college hopes by this opportunity to help in supplying the missing factor in the secondary education in the province, and through the secondary school to help in supplying the missing factor in the rural schools.

THE ORGANIZATION OF RESOURCES COMMITTEE IN ONTARIO

TO what extent the work of the Organization of Resources Committee, formed under a special Act of the legislature of Ontario, has been successful cannot be fully and definitely known until the harvest has been garnered and the season of cultivation and growth has entirely passed. With the presentation of a report dated June 11th, it can fairly be said that the first half of the committee's work for this year has been completed. Soil preparation and seeding are over and care and anxiety has set in as to what the outcome will be. Watchfulness to prevent inroads of insect pests and plant diseases and to suppress the weed evil are now in order until ripening and reaping time comes around. For the present, then the labours of the committee have slackened in so far as organization for preliminary purposes is concerned, but there will be no relaxation of effort and interest, for it is recognized that the busiest period of the year, harvest time, is yet to come, and that then will be heard the most persistent cry for additional labour. Even with harvest over, the committee will not cease its efforts, for it is proposed to take full advantage of the facilities for advertising, and the encouragement of increased energy, offered by the fall exhibitions throughout the province.

COMPOSITION OF THE COMMITTEE

The committee is an influential organization, having the Lieutenant-Governor for chairman, the premier of the province and the leader of the opposition in the legislature for vice-chairmen; Albert H. Abbott, Ph.D., for secretary, and a score of members, including provincial cabinet ministers, members of the Legislative Assembly, the Commissioner of Agriculture, prominent business and professional men and agriculturists.

AIMS AND OBJECTS

The Act sets forth the objects of the committee as follows:—

To aid in securing the conservation, utilization and organization of the resources of Ontario for the successful prosecution of the war, and to secure the increasing and maintaining of the agricultural and industrial production of Ontario and the better development of the natural and other resources of the province during the war and thereafter.

Proceedings opened with sending out a four-page foolscap size circular entitled "The Crisis," pointing out the alarming state of the food situation all the world over and the consequent urgent need for increased production. It showed that in

Ontario alone there was a shortage of food stuffs in 1916 as compared with 1915 of 48,600,517 bushels. A four-page leaflet followed detailing the objects of the Committee, the assistance that was expected from District Representatives and other Departmental officials, to each of whom a special circular was addressed, and the policy that was to be followed. The second paragraph of this leaflet declared:—

The purpose of the present organization is three-fold; (a) To secure all available labour from cities, towns, and villages to work on farms. (b) To create such an attitude in the farmer that he will seed as much land as possible with the labour available, and that he will be willing to do the best he possibly can with the kind of labour which can be secured for harvest. The Organization of Resources Committee takes the attitude that the farmer should seed as much land as possible, trusting to the work of the branch committee in his county to see to it that men are available to harvest the crop. (c) To form an organization which will be sufficiently permanent in character to carry on the work begun this spring into the fall and next year.

The leaflet recognizes all other production organizations as auxiliaries and urges their co-operation.

ACTIVITIES OF THE COMMITTEE

A third circular goes further into particulars of the duties the committee has assumed, outlining at the same time its plans and the co-operation that was expected. This circular states that the first aim of the Committee was to promote increased production by the use of modern machinery, and, the second, to encourage the cultivation of back-yards, vacant lots and waste places. The ladies had organized for the purpose of encouraging the utilization of back yards. The War Production Club of the Board of Trade had undertaken to have the premises of soldiers' wives dug for them and the Horticultural Society was supplying the seed. Rotary Clubs were also assisting. The War Production Club had added five tractors to those being put out by the Provincial Department of Agriculture. Efforts were being made to increase the supply of labour. For the encouragement of high school boys to get out and work, an essay competition had been promoted. Girls were being placed on fruit farms and being looked after by the Young Woman's Christian Association. A number of men had also been released by firms and business corporations to spend the summer on farms.

ORGANIZATION PLANS

The Committee was acting in unison with the various Boards of Trade in their proposition to secure an extension of holidays, so that the employees could undertake farm work. A plan had been adopted whereby existing organizations would have an eye to the requirements of their respective counties. The idea was to organize each county as a unit, in furtherance of which plan meetings had been called throughout the province of bank managers, business men and professional men generally as well as farmers. An extensive newspaper advertising campaign had been undertaken. Employment bureaux had also been opened. The active and energetic co-operation of the District Representatives of the Provincial Department of Agriculture was being received. Many other questions, such as wages, length and times of service, and so on, were considered, and an urgent appeal was made to farmers for sympathetic co-operation.

LABOUR ALREADY PROVIDED

In the report to the executive dated June 11th it was stated that, while no reports had then been received from the local committees, 1,040 men had been placed by the War Production Club of Toronto, of whom 800 had gone for the whole season. The various employment bureaux had also, so far as known, sent out 499 men, 593 boys and 624 women and girls. In addition to these a number of both sexes had been placed by the District Representatives, while the Provincial Department of Education reported that 5,000 boys and 2,000 girls had left the schools to work on farms. Altogether, the report said that about 9,000 men, women, boys and girls had been placed. In addition many had gone from industrial plants throughout the province.

In a summary of the situation the report said:—

From the reports of the District Representatives, it is evident that the acreage under cultivation will be considerably larger than last year. The cultivation of vacant lots and the many back-yard gardens will also have due effect in increasing food production. Your Executive Committee feels however, that results, apart from food production, have been accomplished which are of great value at the moment and absolutely essential if the work of this Committee is to have the best possible results. In a conference with the editors of the farm papers of Ontario, it was brought out that the general attitude of the farmer was not as sceptical in relation to the greater production campaign as it was, even a month ago, and that the town and city men were learning much about the actual work of the farmer which

was broadening their co-operation with him.

More than that, the movement to enlist boys for farm work has taken on a much broader aspect, which is very significant for the future. The Y.M.C.A. and the National Boards of the religious denominations of the Dominion through their boys' work departments, have considered, and officially endorsed, a plan which has been named, "Soldiers of the Soil Movement." Each of the several denominations participating is now promoting this movement which has for its aim, the enlistment and encouragement of boys in food production, the providing of attractive incentive for keeping them interested in their work and the relating of this service to their religious growth and development.

SUB-COMMITTEES APPOINTED

Bulletins in furtherance of the work had been prepared and were being liberally distributed. Arrangements had been made with the Bankers' Association for the provision of loans to purchase seed. A sub-committee had been appointed on fish as a food and as a result 200,000 copies of a pamphlet entitled "Ontario Fish and How to Cook Them" had been circulated. Committees had also been appointed on Economy and the Prevention of Food Wastage and on Poultry. The Secretary of the latter reported that 25 meetings had been held in different parts of the province and that a great deal of promising interest had been manifested.

EYES ON THE FUTURE

The Committee had taken deep interest in the employment of tractors on the farm and understood that additional machines were to be put out for the fall ploughing. A materially beneficial effect was expected on the crops of 1918. Steps had been taken to co-operate with the Provincial Department of Agriculture in utilization of the fall fairs for advertising purposes.

The report states that in order to promote increased production and to secure permanency in the efforts that are being made, a number of field secretaries have been engaged who will spend the summer months visiting various parts of the province and perfecting county organization.

In concluding the report remarks that "As this committee is looking forward to the work of next winter and the production of 1918, it is evident that all the work which we do now should have the winter and next year in view quite as definitely as the securing of labour for farmers this year."

A LADIES' CO-OPERATIVE COMMITTEE

At a meeting of ladies held in the Parliament Buildings, Toronto, on July 12th, a

committee of co-operation was formed with the following members: Lady Hendrie, Chairwoman; Lady Hearst, Mrs. Rowell, Mrs. Torrington, Mrs. H. D. Warren, Mrs. Arthur Vankoughnet, Mrs. L. A. Hamilton, Mrs. A. E. Gooderham, Mrs. Jacob, Mrs. W. O. Duncan, Miss Marie Macdonell and Miss Marion Findlay.

It was also decided to call a province-

wide conference of women, with a view to organizing the women of Ontario for the conservation of foodstuffs to prevent waste and for the advocacy of thrift and economy in the home. At a subsequent meeting of the ladies' committee it was decided that the conference should be held from July 19th to 26th, three delegates to come from each centre, the Provincial Government to pay their expenses.

OFFICIAL WEIGHTS OF VEGETABLES, GRAINS AND SEEDS

THE following table gives the official weights per bushel of the standard classes of vegetables and grains, and the seeds of grasses and clovers:

VEGETABLES	
DESCRIPTION OF ARTICLE	Weight in Dominion Standard Pounds, Per Bushel
Artichokes.....	56 lb.
Beets.....	50 "
Carrots.....	50 "
Onions.....	50 "
Parsnips.....	45 "
Potatoes.....	60 "
Turnips.....	50 "

GRAINS	
Barley.....	48 lb.
Buckwheat.....	48 "
Flax.....	56 "
Indian corn.....	56 "
Oats.....	34 "
Peas.....	60 "
Rye.....	56 "
Wheat.....	60 "

GRASSES	
Blue grass.....	14 lb.
Timothy.....	48 "
Alsike.....	60 "
Lucerne.....	60 "
Red clover.....	60 "

ASSOCIATIONS AND SOCIETIES

PRINCE EDWARD ISLAND DAIRYMEN'S ASSOCIATION

AT a meeting of the Prince Edward Island Dairymen's Association the following resolution previously approved at a meeting of the directors of the association was passed:

"Resolved that the directors of the Dairy

Association be a committee to draw up a definite plan of co-operation and secure a competent man from the provincial Government to improve the dairying industry and particularly co-operation in the marketing of products and the purchase of supplies."

THE QUEBEC HOMEMAKERS' CLUBS

AT the fourth annual convention of the Homemakers' Clubs of Quebec held at Macdonald College on June 20 and 21, 62 delegates attended. In the absence of the principal, Professor Lohead delivered the address of welcome, placing special stress upon the splendid work women were doing in response to demands created by the war.

Mrs. N. C. Macfarlane, Demonstrator for Homemakers' Clubs, presented the annual report which showed that during

the year five new clubs had been organized, that the appointment of an assistant demonstrator in Miss Babb, a graduate from the Macdonald Institute, Guelph, had proved helpful, that 28 demonstrations in preparing and serving school lunches had been given, in consequence of which two academies had been equipped with the conveniences for serving hot lunches, that 57 demonstrations in canning, bread-making and cake-making were given to school children, that every encouragement

was given to boys and girls to form canning clubs, that material assistance in school-fair work had been received from the school of Household Science through the Extension Department, that a bulletin on the Home Canning of Fruits and Vegetables had been distributed, that \$4,000 in goods and cash had been contributed to Red Cross work, that the Sawyerville Club headed the list in Red Cross work with \$692.29, that eight organization meetings had been held and a number of visits paid to school fairs, that county executives can do a great deal towards strengthening branch clubs, that beneficial effect will result from interesting husbands and sons in the work of the clubs, that the Provincial Minister of Agriculture was waited upon and asked for assistance and that he promised the Government would pay for necessary handbooks and for printing the report of the annual convention, that there are clubs in thirteen counties and that efforts should be made to interest the voters and the local representatives in the legislature, that 91 addresses were given during the year by the demonstrator and 2 each by members of the Schools of Household Science and Agriculture, that 16 applications were received for the travelling libra-

ries, that 155 applications for literature were received from the circulating library, that the clubs hold meetings to further the education of boys and girls and that leading educationists be invited to attend, and that the clubs believe with the mothers' clubs of America that "no reform politics, no remedial legislation, no readjustment of wealth can effect much progress until the parents of the coming generation are adequately trained guardians of their children." Sorrow was expressed for the passing of Sir William Macdonald, and regret for the resignation of Miss Fisher, principal of the School of Household Science.

At the different sessions addresses were given on "Music as a Factor in the Home and the Community", by Mr. G. E. Stanton, on "Labour Saving Devices", by Miss Fisher, and on "Water Supply in the Farm Home and Home Plans", by Mr. Starrak. Miss Babb gave a demonstration on "Home Canning and Jelly Making", and Miss Thackeray opened a discussion on "The Sale of These Products", Miss Armstrong on "Girls' Clubs", and Mr. J. E. McQuat, Demonstrator to Rural Schools, on "School Fairs, and How the Clubs may help".

ONTARIO POULTRYMEN'S CONVENTION

A convention of representatives from forty Ontario local poultry associations was held at the Ontario Agricultural College, Guelph, Ontario, on June 13th and 14th, 1917. This convention was brought about through the joint efforts of the Confederation of Poultry Associations and the Live Stock Branch of the Ontario Department of Agriculture. An important feature of the convention programme was the setting of dates for the

various poultry exhibitions and the appointment of judges to act at the same. Among the subjects receiving special attention were those of "Grain Shortage for Feed", and "The Feeding of Buckwheat Screenings". In the discussion of these subjects Prof. W. R. Graham of the O.A.C., Mr. Geo. Robertson of the Central Experimental Farm, Ottawa, and Mr. H. P. Donovan of Toronto, took prominent parts.

ALBERTA HORSE BREEDERS' ASSOCIATION

In order to encourage horse-breeding in the province, the Alberta Horse Breeders' Association has decided to hold a sale of horses under three years of age bred in Alberta during the holding of the Winter

Fair which commences at Edmonton on December 11th. The sale will be open to both pure-bred and grade horses, but foals under one year must have been registered.

BETTER WATER CONFERENCE

A more and better water conference was held at Lethbridge, Alta., under the auspices of the local Board of Trade, on June 22nd. Addresses were delivered by Mr. A. V. White, Engineer of the Commis-

sion of Conservation, Ottawa, by D. B. Dowling, Dominion Geologist, by Dean Howes, of the Provincial College of Agriculture, by F. C. Nunnick, Agriculturist of the Commission of Conservation, and by

Provincial Government officials. At the close a series of resolutions were passed in accordance with the spirit of the conference, urging co-operation between the Dominion and Provincial Governments in the work desired and stating that in the opinion of the conference there should be established at the University of Alberta a

department of agricultural engineering to give the B.S.A. graduates and others interested a course in this work, and to undertake such research work as should be of service to the farmers of Alberta in matters pertaining to road making, irrigation and drainage.

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION'S EXTRA CONVENTION

At the annual convention of the British Columbia Dairymen's Association held in the city of Nanaimo, Vancouver Island, last January, members from the Okanagan Valley urged upon the association to hold the next annual convention at Kelowna. It was felt, however, that the annual meeting, which has always been held at different points on the Island and Lower Mainland, should remain in the older dairy districts, and a promise was given that if possible an extra convention would be arranged for the up-country districts, to take place some time during the summer. Accordingly, arrangements were completed for a two days' convention to be held in Kelowna on June 22nd and 23rd.

On the first day, the morning session consisted of demonstrations in placing and judging dairy cattle and horses by Prof. J. A. McLean, of the British Columbia University, and Prof. W. T. McDonald, Provincial Live Stock Commissioner. In the afternoon, after a picnic lunch served by the ladies of the community, the session opened with an address of welcome from the local member of the Legislature, who told of the rapid development of dairying in the district and of the great increase in the number of silos. Two years ago the only silo in the district was a demonstration one built by the provincial Department of Agriculture; now there are 30 of such structures. Prof. McLean gave a talk on "Feeding Dairy Cattle;" Mr. T. A. F. Wiancko, Provincial Dairy Instructor, spoke on the "Causes of Variations in Cream Tests," and Prof. L. Stevenson, Superintendent of the Dominion Experimental Farm at Sidney, Vancouver Island, in an address on "Corn and Its Relation to the Dairy Industry," emphasized the importance of proper cultivation and seed selection for maximum production. The session closed with an interesting talk on hogs, led by G. S. Harris, Moresby Isle.

The evening session was held in the school-house at Rutland, about six miles from Kelowna, where the farmers are becoming very enthusiastic dairymen, and on their small holdings are going in for

intensive methods. Dr. S. F. Tolmie, British Columbia Representative of the Dominion Live Stock Branch, opened the programme with a talk on "Contagious Abortion, Milk Fever, and Bloating." P. H. Moore, now of Alderley Farm, Royal Oak, V.I., but until recently Superintendent of the Dominion Experimental Farm at Agassiz, gave some valuable pointers on the making of clover silage. He recommended a mixture of 9 lb. red clover, 3½ lb. alsike, 1½ lb. white clover, and 2 lb. rye grass. Prof. P. A. Boving, of the University of British Columbia, followed with a talk on "The Production of Roots," emphasizing the importance of early seeding and of sufficient seed to insure a full stand. Deputy-Minister Wm. E. Scott, of the Department of Agriculture, urged upon those present the importance of increased production.

Concurrently with the Rutland meeting, Prof. W. T. McDonald, Provincial Live Stock Commissioner, addressed the boys' and girls' club at the Board of Trade Rooms, Kelowna.

On the second day the programme opened in the morning with a field-root demonstration at the Bankhead Ranch—one of the largest of the fruit ranches where dairying is carried on as a paying side-line. A dozen or more motor cars took the visitors and speakers through the Glenmore Valley, a distance of about 10 miles to Ellison, where at the farm of Mr. Heroron a further talk on alfalfa and corn was given by Prof. Stevenson.

After lunch, again served by the ladies of the community, Mr. J. W. Berry, of Langley Prairie, and Mr. E. Dodsley Barrow, Member for Chilliwack in the provincial Legislature, spoke on "Co-operation," urging farmers to study particularly the marketing end of their profession.

A motor trip through twelve to fifteen miles of the finest orchards and farm lands of the Okanagan Valley, brought the convention to a close.

CANADIAN RECORD ASSOCIATIONS AND REGISTRATIONS

The following table shows the relative standing of the Canadian Live Stock Record Associations as regards date of incorporation, and membership and num-

ber of pedigrees recorded in Canada. It does not refer to previous records, a number of which for several breeds were established at much earlier dates:

BREED ASSOCIATION	Incorporated Federal Act	Number of Members up to January 1st 1917	Number of Pedigrees Recorded up to June 1st, 1917
CATTLE			
Canadian Aberdeen Angus Association.....	1906	304	12,768
Canadian Ayrshire Breeders' Association.....	1905	1,365	61,460
Canadian Brown Swiss Association.....	1914	8	696
Canadian Guernsey Breeders' Association.....	1905	65	1,884
Canadian Hereford Breeders' Association.....	1905	403	29,050
Canadian Jersey Cattle Club.....	1905	385	8,654
Canadian Red Polled Association.....	1906	47	2,892
Dominion Shorthorn Breeders' Association.....	1901	2,542	243,380
French-Canadian Cattle Breeders' Association.....	1905	172	4,215
Holstein-Friesian Association of Canada.....	1900	2,175	81,794
North American Galloway Association.....	1905	28	2,214
HORSES			
Canadian Belgian Draft Horse Breeders' Association.....	1907	80	1,010
Canadian French Coach Horse Breeders' Association.....	1910	12	113
Canadian Hackney Horse Society.....	1905	182	2,078
Canadian Percheron Horse Breeders' Association.....	1907	381	11,298
Canadian Pony Society.....	1908	61	
(a) Exmoor.....			
(b) New Forest.....			
(c) Polo and Riding.....			1
(d) Shetland.....			900
(e) Welsh.....			146
Canadian Shire Horse Association.....	1905	99	2,447
Canadian Standard Bred Horse Society.....	1910	226	2,387
Canadian Suffolk Horse Society.....	1910	20	390
Canadian Thoroughbred Horse Society.....	1906	156	2,108
Clydesdale Horse Association of Canada.....	1905	2,463	58,536
French Canadian Horse Breeders' Association.....	1905	172	1,674
DOGS			
Canadian Kennel Club.....	1915	876	18,525
SHEEP			
Canadian Sheep Breeders' Association.....	1905	761	
(a) Cheviot.....			1,447
(b) Cotswold.....			2,730
(c) Dorset.....			1,383
(d) Hampshire.....			1,461
(e) Leicester.....			10,880
(f) Lincoln.....			897
(g) Oxford.....			6,790
(h) Shropshire.....			16,975
(i) Southdown.....			1,185
(j) Suffolk.....			2,788
(k) Romney.....			41
SWINE			
Canadian Swine Breeders' Association.....	1905	1,176	
(a) Berkshire.....			45,286
(b) Chester White.....			15,191
(c) Duroc Jersey.....			7,787
(d) Essex.....			
(e) Hampshire.....			1,435
(f) Poland China.....			5,745
(g) Tamworth.....			11,298
(h) Yorkshire.....			55,391

NEW PUBLICATIONS

THE DOMINION DEPARTMENT
OF AGRICULTURETHE DOMINION EXPERIMENTAL
FARMS

THE DIVISION OF CHEMISTRY

The Manuring of Market Garden Crops, with special reference to the use of fertilizers; by Frank T. Shutt, M.A., D.Sc., Dominion Chemist, and B. Leslie Emslie, C.D.A., F.C.S., Supervisor, Investigational Work with Fertilizers; Bulletin No. 32, second series; 36 pages. "A useful bulletin at the present time and for many years to come," says the Director of the Dominion Experimental Farms. It is one that should commend itself to every cultivator of the soil, both amateur and professional, for briefly, concisely and in plain language complete information is given as to the use, composition and value of various forms of fertilizers and the requirements of special crops.

THE POULTRY DIVISION

Poultry-Keeping in Town and Country, by F. C. Elford, Dominion Poultry Husbandman, Bulletin No. 89. As the letter of submission suggests, the publication of this 48-page bulletin at a period when both amateur and professional poultrymen are being urged to exert themselves to the utmost to increase and better production is especially timely. It runs the entire gamut of poultry keeping, housing and breeding and contains close upon 70 appropriate illustrations.

THE DAIRY AND COLD STORAGE
BRANCH

The Manufacture of Cottage and Buttermilk Cheese is the title of Circular No. 22 issued from the office of the Dairy Commissioner. It treats in two sections of "Coagulation of the milk by Souring" and "Coagulation of the Milk by Rennet" and in a third section of the manufacture of cheese from buttermilk.

Small Cold Storages and Dairy Buildings, by J. A. Ruddick, Dairy and Cold Storage Commissioner, and Jos. Burgess, Cold Storage Inspector, is Bulletin No. 49 of the Dairy and Cold Storage series. This bulletin replaces Bulletin No. 35 (now out of print). Bulletin 49, recently published contains plans, specifications and building directions for small cold storages, and farm dairies, in connection with icehouses and refrigerators.

THE HEALTH OF ANIMALS BRANCH

Evaporated Apples, by C. S. McGillivray, Chief Travelling Inspector, Fruit and Vege-

table Canneries, Bulletin No. 24. With many drawings of implements and structures that can be used in the process, this 38-page bulletin describes very fully the method, manner and value of evaporation. It tells of the different types of evaporators, their necessary equipment, of methods of grading, curing, storing and packing, the quantity of moisture that should be retained, of mistakes in manufacturing, the commercial importance and worth as a food.

THE FRUIT BRANCH

Modern Methods of Packing Apples; Bulletin No. 2, Fruit Commissioner's Series; 62 pages. Not only does this bulletin explain in detail, with numerous illustrations, the best methods of packing apples, but it describes with exactness how the boxes and barrels that are used should be made; how the packers should be marked, how the fruit should be graded and the utilization of the packing bench and packing table. Intended for beginners, the bulletin is a treatise from which every packer and shipper will gain some worth-while information.

THE PUBLICATIONS BRANCH

Publications Available for Distribution. A new catalogue of publications issued by the Department of Agriculture and to be had on application to the Publications Branch shows a list of 11 annual reports and 5 special reports, and, of bulletins, pamphlets and circulars, 31 relating to dairy, 64 to field crops, 37 to insects and plant diseases, 51 to live stock, 43 to the orchard and garden, 33 to poultry, and 42 to miscellaneous subjects.

THE PROVINCIAL DEPARTMENTS
OF AGRICULTURE

QUEBEC

Treatment of Potatoes and Seed Wheat, by Georges Maheux, B.A., F.E., Entomological Inspector, is Bulletin No. 41 and deals with the diseases affecting potatoes and seed wheat and gives complete directions for the formalin treatment for the control of the diseases affecting the two plants.

How to Plant Your Fruit Trees, by J. H. Lavoie, F.E., Chief of the Horticultural Service, constitutes Bulletin No. 40. In this bulletin complete directions are given for caring for the young trees when first received and for the successful planting of the same. It concludes with a list of the different varieties of fruit trees and shrubs, particularly recommended for the province of Quebec.

Celery Culture, by J. H. Lavoie, Chief of the Horticultural Service, is Bulletin No. 39. In the preparation of this bulletin Mr. Lavoie was assisted by Messrs. Hamel, Couton and Petraz, horticultural inspectors. This bulletin deals with the celery plant under the headings of species and use, rotation, sowing, soil, plantation, cultivation, blanching, packing, diseases and insects affecting the plant.

The Enemies of our Orchards and Vegetable Gardens and How to Fight Them, by Georges Maheux, B.A., F.E., Entomological Inspector, is Bulletin No. 37 of the Horticultural Service of the Quebec Department of Agriculture. In this bulletin there are contained a list of insects and diseases harmful to fruit trees and notes regarding the best preventives and remedies for the same.

Annual Report of the General Stock Breeders' Association of the Province of Quebec. This publication is a full account of the proceedings of the association's twenty-third annual meeting held in February, 1917, at Montreal, as well as a complete statement of the operations of the association for the year ending 31st December, 1916.

The Production of Capons for the Market, by the Manager of the Poultry Department of the Oka Agricultural Institute. This is a fifteen-page circular describing with illustrations the operation of caponizing, the instruments that should be used and how they should be used. It also tells how capons are to be fed and shows that they are more profitable than roasters or broilers.

Bulletin No. 45 consists of a list of The Circles of Agriculture, Horticultural Societies, Co-operative Societies, and Horse Breeders' Syndicates in the province of Quebec with their presidents and secretaries.

ONTARIO.

The Report of the Minister of Agriculture for the year ending October 31, 1916, makes a blue book of 84 pages. It reviews the work of all the branches and is thus a chronicle of the activities carried on during the last year of the late Minister, the Honourable J. S. Duff, who died on November 17th, and a portrait of whom forms the frontispiece. Comprehensive attention is specially paid to the work of farmers' clubs, women's institutes, boys' and girls' competitions and school fairs. Numerous illustrations add to the interest of the report.

The Pear in Ontario is the title of Bulletin 249 of the Provincial Fruit Branch, written by F. M. Clement, B.S.A., formerly director of the horticultural experiment

station, Vineland, and O. J. Robb, B.S.A. It is an appropriately illustrated bulletin of 28 pages that deals very thoroughly with the cultivation of the pear, contains a chapter on marketing and concludes with a brief treatise on the diseases to which the pear is subject.

Farm Poultry with the Results of Some Experiments in Poultry Houses and Fattening Chickens; by W. R. Graham, B.S.A., Professor of Poultry Husbandry and F. N. Marcellus, B.S.A., Lecturer in Poultry Husbandry at the Ontario Agricultural College, now Bulletin 247, is a revised edition of Bulletin 217. It contains eighty pages with illustrations, diagrams and drawings. It deals with selection and breeding, egg production, housing, feeding, disease, candling, dressing, marketing and so forth.

Ontario Fish and How to Cook Them. This pamphlet of eight pages, issued by the Organization of Resources Committee of the province of Ontario, describes how to cook in various ways, nine varieties of food fishes of the province.

Crop bulletin number 131, being for the month of May, contains a report upon the weather, condition of the crops, live stock, fodder supply and the farm labour of the province, together with remarks of correspondents.

MANITOBA.

Manitoba Agricultural College Calendar, 1917-18, in addition to announcing and describing the regular courses of study in agriculture and home economics which open on October 16, 1917, and close on April 6, 1918, includes the announcements of ten short courses to be held during the year, the exact dates for which will be announced later.

The Annual Report of the Manitoba Agricultural College for the year ending November 30th, 1916, makes a publication of 114 pages with illustrations. Complete reviews of all the activities of the college are given, with a comprehensive introduction by the President, and lists of members of the staff, graduates, undergraduates and employees of the college who have enlisted.

Crop Report, No. 95, published by the Provincial Department of Agriculture, briefly chronicles the conditions in the province for the first six months of the year. Statistics covering 15 years are also given of the number of live stock.

The Ploughing Match, Circular No. 43 of The Extension Service, Manitoba Agricultural College, is divided into two parts: Part I, "Organizing for the Ploughing Match," is written by T. J. Harrison, B.S.A., Professor of Field Husbandry, Manitoba Agricultural College. This part

deals with the evolution of the plough, ancient and modern types of ploughs, the object of ploughing, and includes many hints with regard to the organization of a ploughing match. Part 2, "Field Work of the Ploughing Match," is by F. F. Parkinson, B.S.A., of the Extension Service. This part gives hints with regard to the selection of the field and general directions for a ploughing match. The adjustment of the plough and attachments are fully dealt with, as are the methods of operating in order to get the best results.

Summer-Fallow Competitions in Manitoba, by T. J. Harrison, B.S.A., Professor of Field Husbandry, Manitoba Agricultural College, and S. A. Bedford, Chairman, Manitoba Weeds Commission, is Circular No. 42 of the Manitoba Department of Agriculture. Summer-fallow competitions are now recognized as an important part of agricultural society work in Manitoba. To encourage better methods, the Department of Agriculture gives to agricultural societies engaging in this line of work a special grant of sixty per cent of the amount of money actually paid out in cash prizes. In order that competitions may be conducted throughout the province on a uniform basis, this illustrated circular which describes the objects and needs of fallowing, outlines the conditions under which the competitions are held and prints the score cards to be used in the different districts into which the province is divided.

Crop Bulletin No. 1.—Grain Crops and Live Stock, June, 1917, issued by the Statistics Branch, Department of Agriculture reports that crops prospects in the southern, central and northern districts are favourable, that live stock wintered well and that there is a general tendency among the farmers to act on the advice and counsel of the Department to obtain more and better live stock. The preliminary estimated crop area for the province is 4,245,000 acres, an increase over the final crop area for 1916 of 419,584 acres. Increased acreages are sown to oats, flax,

speltz and green-feed, while decreases are noted in the sowings of spring and fall wheat, barley and rye.

MISCELLANEOUS

The Annual Report of the Pomological and Fruit Growing Society of the Province of Quebec for 1916 is a one hundred and forty page book giving in minute detail the proceedings of the annual summer meeting of the Society held at La Trappe, Que., on September 6th and 7th, 1916. In addition to the report of the summer meeting, the proceedings followed out during the year are reported.

The Eleventh Announcement of Macdonald College, Ste. Anne de Bellevue, Que., being for the college year 1917-18, announces the regular courses in Agriculture and Domestic Science and describes in detail the subjects covered in each of the respective years of the college course. The regulations and course of study followed in the School for Teachers, in so far as they relate to the province of Quebec, are also given in detail. The concluding pages are devoted to a statement of the assistance offered by Macdonald College to the farming community of the province of Quebec.

Home Labour-Saving Devices, by Rhea C. Scott, District Agent for Home Demonstration in Virginia; 119 pages; crown 800; J. B. Lippincott Company, Publishers, Philadelphia. Published with the authority of the United States Government, here is a book containing information of value to every boy and girl and to many men and every woman. It tells how to make practically every kitchen convenience and many other articles that add to the comfort of a home at home and at small cost. Here is a list of the headings to chapters which at once conveys an impression of the little book's contents: Kitchen conveniences, dining room conveniences, porch equipment, miscellaneous equipment, poultry devices, dairy devices, fundamentals in wood-working.

NOTES

The British Columbia Department of Agriculture has authorized the purchase of a limited number of stumping machines to be supplied to Farmers' Institutes on the deferred payment system. This action on the part of the Department of Agriculture is the outcome of a number of requests which had been received by the Department from Farmers' Institutes. The terms of payment for the machines are one-third on delivery, one third in one year and the remaining third in two years.

In addition to the summer courses for teachers annually held in Ontario, a short course of four weeks, at least, in Farm Mechanics will this year be given to teachers who are qualified to teach agriculture in the high schools. In 1916, one hundred and fifty-three teachers attended the summer courses leading to an elementary certificate in agriculture and horticulture and forty-three attended the courses leading to the intermediate certificate.

The dairy industry in Manitoba is improving rapidly, both in quantity and quality of output. The value of marketed dairy products in 1916 was \$4,482,288, as compared with \$3,845,183 in 1915. If the output should continue to increase at the same rate, it will amount to eight millions and a half in 1920.

The yield of grain grown in Manitoba by sowing uncleaned No. 3 Northern seed was 24 bushels per acre, and the grade No. 4; from same seed put once through the fanning mill, 29 bushels, 20 pounds, grade No. 3; from seed put three times through the mill, 30 bushels, grade No. 3. Query: Does it pay the farmer to clean the grain more than once?

A handsome shield valued at \$50 was offered by Hon. Mr. Motherwell, Minister of Agriculture for Saskatchewan, to the winner of the highest average score in the competition of the creamery classes at the provincial exhibition held at Regina, July 23rd to July 27th, 1917. The shield has to be won twice in order to become the absolute property of the successful competitor.

A Farmers' Automobile Tour arranged by J. N. Allan, B.S.A., and E. K. Hampson, B.S.A., District Representatives for Wentworth and Welland Counties, respectively, was taken by 82 farmers in 17 automobiles. During the tour stops were made at Vineland Experimental Station, at Larkin Farms at Queenston, Ont., the Cavanaugh Stock Farm near Buffalo, and at the farm of Mr. F. W. Houck at Black Creek, Ont.

Arrangements have been made by the Minister of Agriculture for British Columbia with the Canadian Pacific Railway Company for the transportation of labour for the harvesting of the fruit crops. A fare and a third round trip rate has been secured to those presenting certificates signed by certain officials of the Department of Agriculture. It is expected that from 1,500 to 2,000 pickers will be required, apart from those regularly employed in the fruit growing districts.

W. J. Bonavia, Secretary of the British Columbia Fall Fairs Association, has announced the dates of agricultural fairs which have been arranged by the Department. The province is divided into six circuits and fairs will be held throughout these circuits beginning July 2nd and ending late in October.

The competition is confined to boys and girls between the ages of ten and fifteen years. Each competitor is required to feed, care for and fit the exhibit for at least three months immediately previous to the opening of the fair. Only one entry may be made by any one competitor. The Saskatchewan Swine Breeders' Association will pay the transportation charges on individual exhibits to the place where the exhibition will be held. In each competition fifteen prizes will be awarded, reaching from four dollars to thirty dollars.

At a meeting of the executive of the Saskatchewan Swine Breeders' Association, held recently in Regina, it was decided by the directors that some of the funds of their association could be spent to no better purpose than to stimulate interest in the swine breeding industry, by interesting the young people. With this end in view the sum of \$400 was set aside to be spent in prizes for a boys' and girls' pig-feeding competition to be held in connection with the Provincial Winter Fairs at Regina and Saskatoon next fall: \$200 each to be offered in fifteen prizes at the respective fairs.

It is estimated that this year 75,000 "additional" acres are under vegetable cultivation in New York City. Formerly real estate agents insisted that home buyers should plant nothing but flowers, shrubs or trees. This year the agents have not only relaxed that condition but they have given up every foot of vacant land to vegetable cultivation. In some cases they themselves had the land prepared for sowing and planting and in others anybody willing to till them could take the vacant lots, practically for nothing or for a small percentage of the production. Several committees had the work of management in hand, one being known as the Food Supply Committee and another as the committee on Food Gardens. These committees obtained a hundred car-loads or 90,000 bushels of seed potatoes from Maine for distribution. They also supplied other varieties of seed. Before the Food Gardens committee was formed there were twenty organizations doing the work they are now doing. The Park Commissioners of Manhattan, Brooklyn and the Bronx are at the head of the movement in each of their districts. In the first week of its work the committee apportioned out from previously waste and meadow land 1200 plots of an average size of a quarter of an acre. Even the golf clubs around the city have gone in for production by ploughing up portions of their links. Well-to-do people generally have shown a disposition to help, either by surrendering land, subscribing money or loaning implements.

In 1916, 358 regular students were in attendance at the Manitoba Agricultural College, and 365 at short courses from two weeks to three months. The effect of the college on agriculture and country life is multiplied many-fold by the teaching these short course students are handing on.

Mr. J. H. McCulloch, District Agriculturist with headquarters at Kamloops, B.C., has resigned from the service of the Provincial Government to take a position in Winnipeg. Mr. McCulloch made his headquarters at Quesnell for several months but recently his district was enlarged and his headquarters transferred to Kamloops. Mr. Geo. C. Hay, who has been stationed at Telkwa, B.C., for the past year and a half as District Agriculturist, has been transferred to Kamloops and will fill the position vacated by Mr. McCulloch.

School Ground Improvement, which was inaugurated in 1914 in British Columbia, made during last year considerable progress. In the neighbourhood of sixty school grounds have already been included under the scheme of improvement of the Department of Education. Mr. J. W. Gibson, Director of Elementary Agricultural Education for the province, gives his personal attention to the planning of these grounds and liberal assistance is further given by way of special grants from the Department. These grants are conditional upon equal amounts being spent by the school boards themselves.

In Vol. I of THE AGRICULTURAL GAZETTE pages 954 to 960, is given a full history of the United States potato embargo of December 22nd, 1913, and its subsequent modification under rigid restrictions. By an order dated June 4th 1917, the United States Government has further amended the embargo order "so as to permit, free of any restrictions whatsoever under the plant quarantine Act of August 20, 1912, the importation of potatoes from the Dominion of Canada and Bermuda into the United States or any of its territories or districts on and after July 1st, 1917."

Strenuous efforts are being made to eradicate tuberculosis from the state of Maine. Acting with the Bureau of Animal Industry of the United States the state has been divided into districts and inspectors appointed to apply the tuberculin test free to all cattle. Especial care is to be taken to have horses and cattle entering the state thoroughly examined.

Mr. R. M. Winslow, B.S.A., Provincial Horticulturist and Inspector of Fruit Pests for British Columbia has resigned his position to become connected with the Mutual Brokerage Company with headquarters at Vancouver. The position vacated by Mr. Winslow has been temporarily filled by the appointment of Mr. M. S. Middleton, B.S.A., who has acted in the capacity of Assistant Horticulturist in British Columbia for the past nine years.

In addition to their duties as agricultural instructors in regular and extension high school classes, the District Supervisor of the British Columbia Department of Education had last year immediate supervision of the rural science work of the public schools tributary to those high schools where agriculture is being taught. This has resulted in very much better work along the line of nature study and school gardening in these public schools, to which the District Supervisors make regular visits. Agricultural classes with regular students were held in the high schools at Chilliwack, Vernon, Armstrong, Murrayville and Cloverdale under the supervision of the District Supervisors. Owing to the fact that the majority of the young men in these districts have gone overseas, these classes were thrown open to men generally, with the result that some of those who attended were men of middle age. The enrolment at these schools was as follows:—

Chilliwack, Advanced Class	9
Junior Class	18
Cloverdale, Junior Class	14
Murrayville, "	27
Armstrong, "	18
Vernon, "	34
Total	120

INDEX TO PERIODICAL LITERATURE

- The Western Home Monthly*, Winnipeg, Man., July, 1917.
 Greater Production in Agriculture, J. B. Reynolds, M.A., President, Manitoba Agricultural College, page 51.
- The Maritime Farmer and Co-operative Dairyman*, Sussex, N.B., June 12th, 1917.
 Soil Fertility—Its Economic Maintenance and Increase, Frank T. Shutt, M.A., D.Sc., Dominion Chemist, page 491.
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- The Grain Growers' Guide*, Winnipeg, Man., June 20th, 1917.
 The Grade and the Loaf—The Baking Quality of the Flour from the Various Grades of Western Spring Wheat, Prof. R. Harcourt, page 1035.
 July 4—Getting Ready for the 1918 Crop, Seager Wheeler, page 1107.
 Making War on Insects—A Cheaper Poison than Paris Green—Biting and Sucking Insects, J. A. Neilson, B.S.A., Lecturer in Horticulture, Manitoba Agricultural College, page 1115.
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 Raising Dairy Calves of Prime Importance, W. J. Reid, B.S.A., Director of Agricultural Instruction, Prince Edward Island, page 5.
 July 6—Rendering Hogs Immune to Hog Cholera—Authoritative Statement on Value of Double Treatment, Dr. F. Torrance, Veterinary Director-General, page 2.
- The Canadian Countryman*, Toronto, June 23rd, 1917.
 Apple Growers met disaster with number 3 Grade, D. Johnson, p. 808.
 July 7—Bred-To-Lay Poultry Returns a Universal Profit, M. A. Jull, page 868.
 An Efficient Water System for Every Farm Home—Some Expert Advice about Installing Water System—Pneumatic or Compressed Air Systems Explained, Thos. Stansfield, page 869.
- Canadian Finance*, Winnipeg, Man., June 20th, 1917.
 Land Settlement and After-War Employment Problems, J. H. T. Falk, Secretary, Winnipeg Social Welfare Commission, page 455.
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 Popular and Practical Entomology—The Death-Feigning Insect, by E. Melville Duporte, Macdonald College, Que., page 221.
- The Farmer's Magazine*, Toronto, Ont., June, 1917.
 A Red Cross Canning Centre, Ethyl Munro, page 17.
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 A Community Field Day, The Editor, page 903.
 June 27—Rural Denmark and Co-operation, S. P. Brophy, University of Saskatchewan, Saskatoon, page 931.
 Agriculture in Schools, page 937.
 July 4—Farm Management and the War—The Business of Farming, J. B. Reynolds, President, Manitoba Agricultural College, page 972.
- The Farm and Ranch Review*, Calgary, Alta., June 20th, 1917.
 The "Why" of Certain Draft Essentials, W. H. J. Tisdale, Assistant Professor of Animal Husbandry, Department of Agriculture, University of Saskatchewan, page 561.
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- The Canadian Thresherman and Farmer*, Winnipeg, Man., June, 1917.
 Better Farm Homes, Prof. L. J. Smith, Department of Agricultural Engineering, Manitoba Agricultural College, page 46.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, Institute Commissioner, Department of Agriculture, Ottawa.

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SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION.

1253 -Agriculture and Agricultural Industries in Roumania,--XENOPOL, NICOLAS, in *Le Mouvement Economique*, Year 12, Vol. XXIII, No. 136, pp. 125-154; No. 138, pp. 191-209. Bucharest, April 1st and June 1st, 1916. (4 pp in Institute Bulletin).

From the agricultural point of view Roumania is particularly adapted to the production of cereals. After the opening of the Black Sea to the ships of Roumania by the Treaty of Adrianople in 1829 the cattle raising industry was to a large extent superseded by the production of cereals. Previously the chief articles of commerce were cattle, wool, wax, wine, salt, hides and salt fish.

At present wheat is the most important cereal raised, occupying almost five million acres. The yield has varied during the past twelve years from 18 to 30 bushels per acre, and this could be easily increased with better methods of cultivation, irrigation and the use of chemical manures. The export of wheat, the value of which ranged from \$41,000,000 to \$51,000,000 from 1911 to 1913, represents almost half of the total export of cereals. Of the eight million

inhabitants of the country, about three fourths seldom eat wheat bread but use corn instead.

The value of the crops of Roumania in 1914 amounted to \$251,000,000 of which \$200,000,000 were for cereals, \$13,500,000 for potatoes and other vegetables, \$18,000,000 for fodder plants, and \$2,600,000 for textile and industrial plants.

About half the rural territory is in the hands of small holders and the large estates take up 40 per cent, the remainder being in large farms. The peasants cultivate not only their own holdings but also a large part of the estates either on shares or as tenants. For this reason the large estates generally lack capital for development or necessary buildings. Aliens possess very little land in Roumania, it having been enacted by a law in 1879 that only Roumanians or naturalized citizens may acquire rural property in that country. The rights acquired before the date of the law were, however, respected.

It is important that the management of waters and forests should be regulated. It will also be necessary in the interests of agriculture to improve the means of transport and increase the railroad mileage. Another important question is that of

storing cereals. The building of docks at Braila and Galatz has solved the problem for part of the cereals destined for exportation, but for the rest of the country it is absolutely necessary to construct at the principal stations, warehouses where cereals may be sorted and classified.

The author gives an account of the milling industry in which over \$8,000,000 is invested. The export of flour represents 7 per cent of that of wheat. There are thirteen establishments for the manufacture of wool fabrics. Wools of a finer quality are imported and the importation of woollen fabrics is considerable as the production is far from supplying the demand. The manufacture of woollen fabrics, at least those of an inferior quality, could be greatly increased if the farmers had not given up live-stock raising for the cultivation of cereals. The number of sheep has lately been diminishing and very little is done to improve the native breeds.

The state owns 2,600,000 acres of forests, and 3,950,000 acres are privately owned the total forest area being 20 per cent of that of the country. The forest industry is in the hands of fourteen powerful associations of very large capital. A large proportion of the timber produced is exported, the value of the exports in 1913 being \$4,700,000.

The paper and pulp industry is quite important in Roumania, there being over \$5,000,000 capital invested in it. The home consumption of paper and paste-board amounted to 40,000,000 lb. valued at over \$2,000,000 in 1914. Roumania does not export any paper. On the contrary in 1913 she imported 3,619 tons of pulp.

1255—Agricultural Instruction by Correspondence in France.—LINET, in *Comptes Rendus de l'Academie d'Agriculture de France*, Vol. II, No. 32, pp 931-933, October 19th, 1916.

In October 1913, the Union of Agricultural Syndicates initiated a system of agricultural instruction by correspondence.

During the period from October to April a monthly bulletin is sent to the students, each containing the material to be studied in the following four weeks. The pupils may be assisted by his parents, or better, by a farmer or other person appointed by the Union. The programme of the course is as follows:

(1) Different subjects are indicated to the pupils to be studied in books furnished by the Union or to be found in the library of their local syndicates. (2) Instructions are given the students for the establishment of experimental plots where they may gain experience in the use of fertilizers, etc. (3) Simple experiments are suggested relative to: the depth at which different seeds may be sown—the germinative power of seeds—relation of the density of potatoes to their starch content—coagulation of clay by lime—action of nitrate of soda on the stooling of the plant and the production of straw—whitewashing, etc. 4. The students are taken by the local instructor to examine the crops, animals and implements on neighbouring farms. 5. The students are instructed to study from books available the nature of the soil in their district, the industrial plants cultivated there and the uses to which they are put, the preparation of seed, planting of fruit trees, etc. 6. They are taught how to solve such agricultural problems as: the value of a certain volume of wheat when the density of the wheat and the price per bushel is known. The value of a certain quantity of manure of which the composition and the prices of the various fertilizing elements are known. The price of the ration of a horse in relation to his weight, of a fattening calf, etc.

The students send to the Union each month an account of the information they have acquired and of their experiments and excursions, and solutions for the problems set before them. The statements are corrected and returned to the students. The monthly bulletin publishes the names of the students who have done the best work.

CROPS AND CULTIVATION

1260—The Overhead Electric Discharge and Crop Production.—BLACKMAN, V. H. and JORGENSEN, I., in *Journal of the Board of Agriculture*, Vol. XXIV., No. 1, pp. 45-49. London. April, 1917.

Description and Treatment of Selected Area.—The experiments upon the effect of the overhead electric discharge upon crop production were continued during 1916 at Lincluden Mains Farms, Dumfries. These experiments, as in previous years, owe much to the careful way in which they were carried out by Miss E. C. Dudgeon.

As in 1915, oats were chosen for the experimental crop. A large field of nine acres which in the past had given uniform crops was selected; the soil was a sandy loam. The field had been in pasture without manure for the three previous years, having been grazed by cattle and occasionally by sheep.

Of this field one acre was selected as the electrified area, and two half-acres were chosen as controls. Control 1 was not far from the electrified area, but, as measurement showed, it received only a slight dis-

charge when the wind blew from the West and Northwest. Control II lay south-east of the electrified area and so was out of the track of the prevailing westerly winds; also, it was at such a distance from the electrified area that even with northwest winds it received practically no discharge.

The difficulty of confining the discharge to the special area to be electrified is much reduced by keeping the wires low (1). The "earthed" screen of wire netting which was used in previous experiments to prevent the spread of the discharge to the control areas, was found in 1916 to be unnecessary owing to the low position of the discharge wires and the distance and position of the controls.

The overhead discharge was applied by means of a series of 21 wires running parallel to the short sides of the rectangular area (88 by 55 yards), the wires being thus about $4\frac{1}{2}$ yards apart. The wires were supported at their ends at a height of 7 ft. from the ground, but, towards the close of the experiment, sagged downwards at the centre to a height of only 6 ft. The current supplied through the primary circuit was about the same as in previous years, namely, 3 amperes, at 50 volts, but owing to the lower level of the wires (7 ft. as compared with 10 ft. in 1915, and 15 ft. in 1914) and the closed arrangement of the wires ($13\frac{1}{2}$ ft. as compared with 15 ft. in 1915, and 20 ft. in 1914) the intensity of the discharge received by the crop was much increased (2).

(1) It has been shown by Jorgensen and Priestley (*Journal of Agricultural Science*, VI, 1914) that when the wires are fixed at a considerable height above the ground the wind may carry the discharge over a wide area.

Effect of Electrical Discharge on Crop.—The crop was sown on 27th March, and appeared above ground on 13th April, the discharge being started on 14th April. By 16th May there was a marked difference between the electrified and the control areas, the plants which had received the discharge being of a markedly deeper green colour and also taller. Measurements were taken at intervals of the average

height of the plants on the three areas; the results are given in the following table:

	18th June	25th June	3rd July
Electrified.....	19 in.	24 in.	32 in.
Control I.....	14 in.	19 in.	21 in.
Control II.....	12 in.	18 in.	20 in.

After 3rd July it was not possible to get among the plants without damaging the crop; the measurements were therefore discontinued.

It was clear that the effect of electrification extended some little distance from the electrified area, for the height of the crop around the area was above the average and gradually decreased with increasing distance from the experimental area.

(2) The intensity of the discharge received can be increased by (1) lowering the wires; (2) reducing the distance between the wires; (3) reducing the thickness of the wires. The wire employed was "silicium bronze" of gauge 24.

The discharge was continued until 17th August, being used only in the daytime and discontinued during actual rain. The discharge was applied for 848 hours altogether during the season.

The season was very good up to the middle of August and, the electrified crop was markedly taller than the rest of the field and much heavier in grain; it was generally agreed that it was the finest crop of oats in the district. Unfortunately, heavy rain storms set in during the latter part of August and caused considerable "laying" of the heavy electrified crop, and also delay in cutting. This led to failure to garner the whole crop, owing mainly to loss of grain before harvesting. The crop was cut on 28th and 29th August, carted on 11th September, and threshed on 12th September.

The yields obtained on harvesting are given below for the electrified area and the two control areas. The grain was weighed as a whole, and the result is given in bushels of 42 lbs.; in the case of the straw every tenth "bunch" was weighed, and the weight of the whole crop calculated from the average weight of the "bunches" so obtained.

	Grain	Straw
Electrified area. (1 acre)	62 8 bus. Qual. 1, 1,942 lb. (2,637 lb.) " 2, 695 "	4,924 lb. (316 bunches, av. wt. 15.6 lb.)
Control Area I..... ($\frac{1}{2}$ acre)	20 bus. Qual. 1, 630 " (840 lb.) " 2, 210 "	1,218 lb. (99 bunches, av. wt. 12.3 lb.)
Control Area II..... ($\frac{1}{2}$ acre)	22 bus. Qual. 1, 714 " (924 lb.) " 2, 210 "	1,401 lb. (103 bunches, av. wt. 13.6 lb.)

The electrified area, as compared with the control areas, gave an increased yield of 20 bushels (840 lb.) of grain (14 bushels of first quality and 6 bushels of second quality) and 2,305 lb. straw. Calculating the percentage increase over the two control

areas we obtain the following result:—

Increase in grain, 49 per cent
" " straw, 88 "

After making allowance for the large experimental error inherent in agricultural

experiments where the number of plots is small, it is clear that these results—taken in conjunction with those of 1915 (in which oats subjected to a weaker discharge yielded 30 per cent. increase in grain and 58 per cent increase in straw),—demonstrate that under the conditions of the experiments oats respond very markedly, by an increased yield both in grain and straw, to the action of the overhead electric discharge (3).

It is not possible at present to estimate accurately the financial results of the experiment. At Lincluden electric current from a power station is not obtainable, so the supply was derived from a small dynamo driven by a petrol engine. The apparatus used to produce the necessary high tension current is comparatively inefficient and not such as would be used for work on a large scale. It may be stated, however, that taking the price of produce in the district at the end of September 1916, (oats 1st quality, 91 cents per bushel; 2nd quality, 75 cents per bushel; straw, \$13.38 per ton) the increased value of the crop works out at \$30.00 per acre. The cost of the current used, about 130 B. of T. units, when calculated at 2 cents per unit, works out at only \$2.67. The cost of an installation on a large scale cannot be predicted at present, but the profit shown above would permit of a heavy expenditure on an installation.

(3) If the climatic conditions had been favourable the yield of grain would have been still greater, as explained above. Mr. Cameron, who farms the land, estimates the loss from this cause at 10 bushels; if this be accepted, the increase in grain works out at 78 per cent. On a basis of a loss of 5 bushels, only, the increase becomes 62 per cent.

Residual Effect of Discharge.—A new and important aspect of the problem has been disclosed by the discovery that the application of the discharge one year may increase the size of the crop the next year, i.e., there may be a marked "after effect". The field in which the experimental crop was grown in 1915 was sown with clover and grass at the same time. The difference between the crop of clover-hay produced in 1916 on the electrified area of 1915, and that on the non-electrified area, was very obvious to the eye, and there was a marked increase in the weight of the crop obtained from the electrified area. The question of "after effect" will be investigated in future experiments. It is to be noted that this field had been well limed before the oats were sown.

If, in addition to an immediate increase of the treated crop, the electric discharge may also benefit a succeeding crop, it is obvious that the agricultural value of the application of the discharge becomes very much enhanced.

Problems still Needing Investigation.—Before, however, the use of the overhead electric discharge can be recommended to far-

mers, more knowledge on many points must be available. The conditions under which the effect is produced—its relation to light, humidity of the air, etc.—have to be studied. The most suitable strength of discharge has yet to be discovered; the experiments suggest that with a greater intensity of discharge still bigger yields might be obtained. The manurial conditions best suited to crop production under the discharge, and the question as to the possible effect of various types of soil, have yet to be investigated. Electrical engineering problems also arise as to the most economical methods of producing the necessary high tension current. There is also the question of the manner in which the electric discharge influences the growth of the crop—a question which is still quite unsolved.

1274—Value of Immature Potato Tubers as Seed.—HUTCHINSON, H. P., in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 6, pp. 529-539. London, September 1916.

Many practical potato growers believe that tubers lifted in an immature or unripe condition give better yields than tubers of the same varieties which have been allowed to remain in the ground until their full development has been attained. The correctness of this belief has been proven by experiments made at Garforth, Yorkshire, with mid-season and late varieties in 1905 and 1906, and at Wye and Midland College in Kent from 1912 to 1916.

In the latter experiment the variety "Factor" yielded from a plot planted with mature seed at the rate of 455 bushels per acre and from immature seed at the rate of 518 bushels.

In 1915 the "King Edward" variety yielded from mature seed 231 bushels per acre and from immature seed 482 bushels.

The use of immature potatoes as seed gave more vigorous plants less susceptible to diseases and earlier and larger crops.

The superiority of immature seed may be due to the following causes:

1. *Method of selection:* In usual farming practice the tubers retained for farming purposes are of medium and smaller sizes. On the other hand by raising the plants before growth the largest tubers of the crop, being then of seed size and mostly derived from the most productive plants, are retained, with the resulting tendency to increase, or at least to maintain previous productivity.

2. *Structure of the tuber coats:* In contrast with that of mature tubers, the cortex of immature tubers is thinner, less firmly attached and capable of being more easily ruptured. This facilitates imbibition of water from without, respiration, etc., and consequently germination.

3. *The amount and condition of the reserve food material:*

4. *The length of time of storage:* The length of time of storage being longer for immature tubers a larger proportion of the starch has decomposed, giving rise to a more readily available form of plant food.

1278—*Comparative Yields of Hay from Several Varieties and Strains of Alfalfa in South Dakota.*—HUME, A. H., and CHAMPLIN N., in *South Dakota State College of Agriculture and Mechanic Arts, Agricultural Experiment Station, Bulletin No. 163*, pp. 282-343. Brookings, South Dakota, January 1916.

1291—*The Fruiting of Trees in Consecutive Seasons.*—PICKERING, S., in *The Journal of Agricultural Science*, Vol VIII, Part I, pp. 131-135. Cambridge, September 1916.

Points of considerable interest, both scientific and practical, are raised by the question as to whether a tree which fruits exceptionally well as compared with its fellows in one season will tend to fruit exceptionally well, or the reverse, in the following season. There seems to be no definite reason why the behaviour of a tree as regards fruiting should alternate in consecutive years, and no such behaviour has been observed in the case of animals. Its doing so would imply that fruiting is due to the gradual accumulation of some substance in the tree, which becomes exhausted whenever heavy bearing occurs, and that the stock of this substance does not become properly replenished till after another season has elapsed.

The difficulties in obtaining exact measurements of the relative behaviour of any

two or more trees in consecutive seasons are considerable. The weight of the fruit or the number of fruits may be recorded, but unless the trees are absolutely similar in size, disposition of branches, situation, etc., which is impossible, the superiority of the one over the other may be misleading. On the other hand, the trees under observation may be classified by inspection, grouping them according to the extent which they are loaded with fruit, independent of their size, and then comparing the classification in one year with that in the following year. This latter method was adopted in the case of one series of observations on trees at Harpenden, and the former in the case of the other series on trees at Richmond.

Whichever method of observation was adopted the results were treated as follows: two selected trees were numbered 1 or 2, according to which of them bore the heavier crop in consecutive seasons; then, comparing the results in two consecutive seasons, if the order of fruiting had been the same (consecutive fruiting), the difference between the numbers given to the trees would be 0, if the order had been reversed (alternate fruiting) the difference would be 1; whereas if neither consecutive nor alternate fruiting prevailed, and the results were dependent solely on chance or on external conditions, the differences would, on the average, be 0.5. An average difference, for instance, of 0.75 would be half way between 1 and 0.5, indicating that the results were dependent on the alternating tendency to the extent of 50 per cent, and on chance fruiting to the extent of 50 per cent.

Results are given in Table 1:

TABLE I

PLACE	Varieties	Date	Instances	FRUITING INDICATED		
				Consecutive	Alternate	Chance
Harpenden	Several	1899-1903	332	0	44	56
Richmond	Bramley	1904-1913	1,950	12	0	88
"	Cox	1898-1909	840	16	0	84
"	Potts	1897-1904	1,266	5	0	95
"	Stirling	1897-1913	366	0	6	94
"	117 diversae	1906-1913	1,207	15	0	85

The results at Harpenden and at Richmond are therefore very different; but those at Harpenden may be discounted to a certain extent on account of the small number of cases observed.

The author also indicates the yields of

several varieties of apples in Table II, the numbers giving the relative magnitude of the crops compared, in the case of Stirling Castle, with the crop in 1900 as 100, and in the other cases with that of 1911 as 100.

TABLE II.

	Stirling	Bramley	Several Varieties
1897.....	3	.....	.....
1898.....	30	.....	.....
1899.....	6 —	.....	.....
1900.....	100 +	.....	.....
1901.....	47	.....	.....
1902.....	144 +	.....	.....
1903.....	0 —	.....	.....
1904.....	148 +	85	0
1905.....	0 —	6 —	0 —
1906.....	144 +	7 +	12 +
1907.....	38 —	20 +	20 +
1908.....	95 +	7 —	15 —
1909.....	171 +	103 +	34 +
1910.....	264 +	9 —	13 —
1911.....	78 —	100 +	100 +
1912.....	47 —	0 —	10 —
1913.....	207 +	103 +	114 +
1914.....	0 —	0 —	0 —
1915.....	549 +	159 +	114 +

A plus or minus sign has been placed after the values showing whether they are above or below the means of the preceding and succeeding seasons, and the extent to which these signs indicate, although not without some irregularities, is very remarkable; and this alternation may now be extended by another season, for the crops this year are far below the average. In the case of Cox and Potts no such alternations were recognizable, but, of course, owing to differences in the dates of blossoming, and the hardness of the flower buds, all varieties would not be affected to a like extent by frost in any given season.

LIVE STOCK AND BREEDING

1295—*Chalcis Calliphorae* N. Sp., and *Nasonia Brevicornis*, attacking the Larvae of Sheep Maggot Flies.—FROGGATT, W. W., in *Queensland Agricultural Journal*, Vol. VI., Part 3, pp. 177-179. Brisbane, September 1916.

Description and illustration of a new parasite of the maggots of the blow-fly, *Calliphora oceaniae* discovered by M. T. MacCarthy who has given it the name of *Chalcis calliphorae*. It is a little black wasp about the size of the domestic fly, which lays one egg in each maggot before it searches cover. This wasp is hardy, easy to handle and breed, and able to stand a long journey by post in a packet.

Nasonia brevicornis is another parasite of *Calliphora oceaniae* previously discovered. It develops more rapidly than *Chalcis calliphorae* and is more prolific. It is equally hardy and easy to breed.

1301—Fish Meal as a Food for Pigs.—CROWTHER, C., in *The Journal of the Board of Agriculture*, Vol. XXIV, No. 1, pp. 27-33. London, April 1916 (4 pages in Institute Bulletin).

Experiments carried out at Manor Farm, Garforth (experimental farm of the

University of Leeds and the Yorkshire Council for Agricultural Education).

Twelve large white pigs, ranging in age from 13 to 21 weeks, were divided into two lots as evenly as possible, each lot consisting of 3 castrated hogs and 3 gilts. In making up the lots attention was paid not only to age and live-weight but also to breeding, to ensure that each litter drawn from should be represented as uniformly as possible in each experimental group.

The animals were weighed weekly throughout the experiment, and at each weighing not only was the total weight of each lot ascertained, but the weight of each individual was taken as accurately as the weigh-bridge would permit ($\frac{1}{2}$ lb.), so that a rough guide as to the rate of progress of each animal was obtained.

No milk, whey or dairy refuse was fed at any stage of the experiment.

It will be observed that the experiment consisted of a comparison of equal weights of sharps and fish-meal, the latter forming from one-seventh to one-ninth of the total allowance of dry food, and rising in the last month of the experiment to rather more than one lb. per pig daily. The general plan of the experiment is summarized in the following table:

PERIOD	General Character of Feeding	AVERAGE DAILY RATION PER LOT OF 6 PIGS	
		Lot A	Lot B
Preliminary Control Period (4 weeks, June 15th to July 13th).	Identical for both lots. (No Fish Meal).	2 4 lb. Bran 12 0 " Sharps 72 " Water	2 4 lb. Bran 12 0 " Sharps 72 " Water
First Transitional Period (1 week, July 14th to 20th).	Fish Meal gradually introduced into ration of Lot A, in place of equal weight of Sharps.	3 0 " Bran 13 5 " Sharps 1 5 " Fish Meal	3 0 " Bran 15 0 " Sharps
First Experimental Period (6 weeks, July 21st to Aug. 31st).	Lot A—Bran, Sharps and Fish Meal. Lot B—Bran and Sharps.	90 " Water 4 1 " Bran 18 1 " Sharps 2 7 " Fish Meal	90 " Water 4 1 " Bran 20 8 " Sharps
Second Transitional Period (1 week, Sept. 1st to 7th).	Rations of lots gradually transposed.	107 " Water 5 8 " Bran 27 5 " Sharps 1 4 " Fish Meal	107 " Water 5 8 " Bran 25 3 " Sharps 3 6 " Fish Meal
Second Experimental Period (6 weeks, Sept. 8th to Oct. 19th).	Lot A—Bran and Sharps. Lot B—Bran, Sharps and Fish Meal.	139 " Water 6 5 " Bran 32 5 " Sharps	139 " Water 6 5 " Bran 27 1 " Sharps 5 4 " Fish Meal
Third Transitional Period (1 week, Oct. 20th to 26th).	Fish Meal gradually introduced into ration of Lot A. Ration of Lot B unchanged.	146 " Water 8 " Bran 36 " Sharps 4 " Fish Meal	146 " Water 8 " Bran 33 " Sharps 7 " Fish Meal
Final Control Period (3 weeks, Oct. 27th to Nov. 17th).	Identical for both lots. (Fish Meal included in ration).	160 " Water 9 8 " Bran 42 2 " Sharps 7 0 " Fish Meal 182 " Water	160 " Water 9 8 " Bran 42 2 " Sharps 7 0 " Fish Meal 182 " Water

The fish meal used in the experiment contained rather less than the average proportion of protein (albuminoids) and decidedly more than the average proportion of oil. This latter fact probably enhanced the feeding value of the meal, but at the same time, according to popular belief, would increase the risk of imparting a fishy taint to the carcass. The meal contained at most 2.6 per cent. of common salt, representing, in the highest allowance of

fish meal used, a quantity of about $\frac{1}{2}$ oz. of salt per pig daily. The supply of salt to pigs is commonly deprecated, but this amount produced no apparent ill-effects. Only one of the samples analyzed contained more than this proportion, and was obviously very exceptional in this respect.

The average gains in live-weight for the different periods of the experiment are summarized below:

AVERAGE WEEKLY GAIN IN LIVE-WEIGHT PER PIG

PERIOD	Nature of Feeding	LOT A			LOT B			Average Difference in favour of Fish Meal
		Hogs lb.	Gilts lb.	Avg. lb.	Hogs lb.	Gilts lb.	Avg. lb.	
Preliminary Control Period (4 weeks).	Identical—No Fish Meal.	5 3	5 5	5 4	4 8	5 2	5 0	
First Experimental Period (6 weeks).	Lot A—Fish Meal. Lot B—No Fish Meal.	11 0	10 6	10 8	8 3	10 8	9 5	1 3
Second Experimental Period (6 weeks).	Lot A—No Fish Meal. Lot B—Fish Meal.	10 3	9 0	9 7	11 5	10 6	11 1	1 4
Final Control Period (3 weeks).	Both lots receiving Fish Meal.	15 4	12 0	13 7	12 5	11 1	11 8 (a)	

(a) This average is depressed by the abnormally low gain recorded in the last week, when two gilts being in oestro, not only failed to gain in weight, but caused general disturbance of the whole lot. The averages for the preceding two weeks were:—Lot A, 14.4 lb.; Lot B, 14.7 lb.

Taking the average for the whole 12 weeks covered by the two experimental periods, it will be observed that the use of fish meal, to the extent of practically one-eighth of the total ration, as a substitute for an equal weight of sharps increased the cost of feeding by barely 1 cent per pig per week. In these calculations of cost the residual manurial values of the feeding-stuffs have not been taken into account.

If these be allowed on the scale suggested by Hall and Voelcker, the fish meal ration becomes actually cheaper than the ration of bran and sharps, since the manurial value of the fish meal, if of the quality used in the experiment, is \$21.50 per ton of 2,240 lbs., while that of the sharps is but \$7.05 per ton.

Even if we leave out of account, however, these somewhat speculative estimates of manurial value and take into considera-

tion simply the purchase prices quoted above, the fact that, on the average, an extra 1.35 lb. of live-weight was obtained weekly for 12 weeks, at the trifling cost of barely 1 cent per week, can leave no doubt as to the decided benefit which has resulted in this test from the partial replacement of sharps by fish meal.

The scale of the experiment is too small to warrant the conclusion being drawn that an equally profitable result would always be obtained, but the results, taken in conjunction with those of the Seale-Hayne experiments, do lend substantial support to the claim that fish meal is a valuable feeding-stuff for pigs.

There remained to be examined the possibility that the use of fish meal might have imparted an objectionable taint to the carcasses of the animals. In order to see if this were the case, one pig from each lot was killed and dressed on 24th November, one of the two having consumed fish meal daily for the last 11 weeks of its life, the amount exceeding 1 lb. daily for the last five weeks. In neither case could any exception be taken to the general appearance, colour or smell of any portion of the carcass. Portions of the carcass were submitted further to a cooking rest with similar results. At no stage of the cooking could any exceptional smell be detected, and the flavour of the cooked meat, fat and lean, was above reproach. This is in agreement with the recorded experience of other experimenters with fish meal.

1303—Fecundity in Hens in Relation to Stamina.—DUNNICLIFF, A. A., in *The Agricultural Gazette of New South Wales*, Vol. XXVII, part 7, pp. 507-510. Sydney, July 1916.

The danger signal has been raised by more or less authoritative critics in various parts of the world that the striving for higher and higher egg production, and breeding from hens of great fecundity, can only result in degeneration of the constitution of the stock and consequent disaster to the breeder.

If such a danger really exists, egg-laying competitions exercise a dangerous influence by fostering and stimulating the breeder's efforts to attain high records at the expense of the vitality of the layers and the stamina of their progeny. In New South Wales, where this work has been in continuous progress longer than in any other part of the world, the attainment of high records has never been subordinated by the controlling committees to practical and utilitarian considerations, as

the restrictions as to quality, size of eggs, and weight of the pullets testify.

It is instructive to trace the results of breeding from hens that have put up high records. The author cites the cases of a pen of white leghorns which won the second two years' test with 1,474 eggs in the first year and 1,150 in the second year, and another pen which won the fourth two years' test with 1,324 eggs in the first and 1,045 in the second year. Both belonged to the same owner. They proved entirely satisfactory as breeders, both as regards fertility and the constitutional vigour of the progeny. The tendency to weakness which has been pointed out as concomitant of high fecundity did not exist. The same result was shown in the cases of white leghorns, from a championship pen, the four leaders of which laid 267-270-270-288 eggs in one year. Their descendants were remarkably vigorous.

The author concludes that what is necessary in successful breeding is selection and skilled care of the flock. We should not regard as good breeding hens only those which are average layers; moreover, that "average" is very variable having been successively 150 and 180 eggs per year and 200 at the present time. There is no reason at all for rejecting hens having an annual production of 250 eggs or even more.

1304—Distribution of Fish and Eggs of Fish made by the Bureau of Fisheries of the United States Department of Commerce during the year 1914-15.—JOHNSON, R. S., in *Department of Commerce, Bureau of Fisheries, Document No. 828*, 138 pages. Washington, 1916, (2 pages in *Institute Bulletin*).

During the fiscal year 1914-15, the Bureau of Fisheries distributed about fifty different species of fresh water fish outside of fresh water shell fish (*Lampsilis ventricosa*, *L. ligamentina*, *L. luteola*, *L. recta*, *L. anodonoides*, *Plagiola securis*, *Quadrupla pustulosa*). Other species of fish were caught in the flooded territory of the basin of the Mississippi and replaced in the rivers from which they came when the floods were terminated. A table in the article in the *Institute Bulletin* gives the details of the distribution of each species.

FARM ENGINEERING

1308—Steam waggon for carrying timber up to 45 feet in length.—*The Implement and Machinery Review*, Vol. 42, No. 498, pp. 663. London, 1916.

RURAL ECONOMICS

1312—**Possibility and Means of Increasing the Crop Production of the United Kingdom.**—RUSSELL, E. J., in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 6, pp. 555-560, London, September 1916 (4 pp. in *Institute Bulletin*).

This was the subject of an address by the author who is president of the Agricultural section of the British Association.

In the development of British agriculture there have been three great lines of progress: (a) the introduction, usually from Flanders, of crops which had not previously been grown on British farms, (b) the removal of obstacles which prevented crops from making as full growth as they might, and (c) the introduction of new methods for increasing the growth of the plant.

Increased yields per acre.—The main obstacles to increased plant-growth lie in the climate and in the soil. Climate apparently cannot be altered; we have to adapt ourselves to it by growing crops and varieties suiting to the conditions that happen to obtain. Soil can be altered, and it is possible to do a good deal in the way of changing it to suit the crops that are wanted.

On *light soil* the two great obstacles to be overcome are the lack of water and the poverty in plant nutrients. The problem can be dealt with by increasing the depth of soil through which the roots can range, or by adding the necessary colloidal substances—clay, marl, or organic matter. As regards depth of soil, where a thin layer of rock separates the top soil of sand from a great depth of sand below, improvement can be effected by removing the rock—a cheap method being possibly the use of high explosives available at the end of the war; to prevent reforming of the rock occasional deep ploughing must be carried out. The process of adding marl to sand has disappeared in England on account of transit difficulties; the usual methods are to add organic matter either by dressings of farmyard manure, by feeding crops to sheep on the land, or by ploughing crops and crop residues straight into the soil; the addition of organic matter must generally be accompanied by the addition of lime or limestone (otherwise the soil may become sour) and all the plant nutrients—nitrogen, potash and phosphates—as well as by constant cultivation to keep down weeds and retain soil moisture. When all this is done, light soils become very productive; they will grow almost any crops, and they can be cultivated easily and at almost (but not quite) any time. On account of the costs of the above processes crops must be grown which bring in a high money value—potatoes, greens, peas,

sugar-beet, or two crops in a season—although the money-finding crop need not be taken very often. The best hope for improvement of light soils lies in increasing the number of money-finding crops, improving the methods of growing them and the relation to the other crops or the live stock, and improving the organization for disposing of them, so that farmers will feel justified in spending the rather considerable sums of money without which these light soils cannot be successfully managed.

Heavy land can be improved by liming or chalking followed by drainage. Mole drainage promises to be an efficient and much cheaper substitute for the old system of draining, but co-ordination and a certain amount of control over the whole drainage area is needed, it being undesirable that a great fundamental improvement should be at the mercy of individuals. The cultivation of clay land is always risky, however as it is suited only to a limited number of crops, and it is difficult to cultivate, and hence most men lay down this land to permanent grass. The risk can be reduced:

(a) By quicker ploughing in autumn so as to bring the work well forward; this seems only possible by the use of the motor plough. Dr. Russell believes that motor ploughs and cultivating implements will play a considerable part in the improvement of heavy land.

(b) By keeping up the supplies of organic matter in the soil; the simplest plan seems to be the adoption of the North Country system, in which the land is alternately in grass and in tillage. Dr. Russell thinks that demonstrations on such lines in heavy-land districts would resolve many of the farmers' doubts as to the advisability of breaking up some of their grass land.

There will always be some grass on the clays and this must be improved—in most cases by basic slag—with possibly further treatment of the improved herbage.

Loams present no special difficulties. The crop may be hampered by lack of root loam, in which case periodical deep ploughing or subsoiling may bring about a substantial improvement; sub-soiling at Rothamsted at a cost of about \$5.00 per acre was followed by an increased yield per acre of 10 cwt. of potatoes, worth \$8.50.

All the above soils can next be further improved by proper treatment with fertilizers. There comes a point, however, where further increases in fertilizer dressings cease to be effective because the plant cannot grow any bigger, or it cannot stand up any longer, or its resistance to disease is weakened; here, therefore, new

varieties must be found that can grow bigger or stand up better or are more resistant to disease. Dr Russell anticipates considerable improvements from a closer co-ordination of crop variety and soil and climatic conditions.

Reduction of Cost per Acre and Increase of Certainty of Production—One of the most hopeful ways of attacking this problem is to increase the efficiency of the manurial treatment; the whole of the fertilizing constituents applied to the soil are never recovered in the crops, but by arranging a proper rotation, and by using a properly balanced manure the loss can be much reduced. As regards this latter point Dr. Russell pleads for agreement between the county authorities as to a uniform scheme after the war in their manurial experiments.

Economy is also possible in the management of farmyard manure, the production of which is estimated at 37 million tons annually, valued at \$46,000,000, compared with an annual consumption of \$32,000,000 worth of artificials.

Further saving is possible in the soil itself; where there is no crop there is a loss of valuable nitrates over the winter, the heaviest loss occurring in the best manured land. This emphasizes the need for spring dressings of quick-acting nitrogenous manures, and accounts for the marked improvement that set in on many soils when spring dressings are given. A good way of getting round the difficulty is to sow a catch crop in autumn and either to plough it in before the main crop is sown or to feed it to stock, whichever is more convenient. Wibberley has discussed several schemes of continuous cropping which give a succession which cover the land at the critical time when losses occur. Our implement makers are steadily increasing the number and effectiveness of the implements for the purpose, while motor traction promises also to increase the speed of working.

Dr. Russell next dealt with the improvement possible in cultivation which will result from the use of the motor plough or tractor, enabling the farmer to plough just as much as he likes in the autumn, or, if

he wishes, to get in a bastard fallow or catch crop; and alluded finally to economy in the choice of crops. The need for accounts was emphasized as enabling unprofitable crops to be replaced by profitable. Swedes, e.g., are invariably grown at a loss at Rothamsted, and Dr. Russell believes this would be found not uncommon in the South of England.

Lastly, there is a factor which operates against increased crop production which Dr. Russell thinks it unreasonable to hope to see entirely abolished, and that is that a farmer has to get his pleasure out of the countryside as well as find his work in it, so that trees, hedges and copses are left, pheasants bred, foxes and hares preserved, and rabbits spared. "It would be wholly unreasonable to expect the farmer to lead a life of blameless crop-production unrelieved by any pleasure, and it would be a social folly of the highest order to make the young farmer exchange the innocent pleasure of an occasional day's shooting, or hunting in the country for the night's pleasure in town. . . . I think we shall always have to be content with getting less crop-yields than the land might produce because we must always keep up the amenities and the pleasures of the countryside. We must maintain the best equilibrium we can between these somewhat—but not wholly—conflicting interests."

"When we know more about the soil, the animal, the plant, etc., we shall be able to increase our crop-yields, but we shall lose the best of our work if we put the crop-yield first. Our aim should be to gain knowledge that will form the basis of a true rural education, so that we may train up a race of men and women who are alive to the beauties and the manifold interest of the countryside, and who can find there the satisfaction of their intellectual as well as their material wants. If we can succeed in that, we shall hear far less of rural depopulation; instead we may hope for the extension of that type of keen healthy countryman which has always been found among the squires, farmers, and labourers of this country, and we believe was already increasing before the war. With such men and women we can look forward with full confidence to the future."

AGRICULTURAL INDUSTRIES

1319—*Arsenate of Lead in Viticulture*.—MUTTELET, C. F., in *Annales des Falsifications*, Year 9, No. 84-95, pp. 298-301. Paris, August-September 1916 (2 pp. in Institute Bulletin).

1327—*New or Interesting Mushrooms in England*.—GROVE, W. B., in *The Journal of Botany British and*

Foreign, Vol. LIV, No. 643, pp. 185-193; No. 644, pp. 217-223, Pl. 542-543. London, 1916.

The author continues to enumerate the new mushrooms and those of note, found in different parts of England, comprising 252 species or varieties. The present contribution, which is the fifth list, registers 40.

PLANT DISEASES

1331—The Appearance of Cryptogamic Diseases in Soils Planted to Potatoes for the First Time, Clean Seed being used.—PRATT, O. A., in *Journal of Agricultural Research*, Vol. VI, No. 15, pp. 573-575. Washington, 1916.

It has generally been assumed by plant pathologists that if disease-free potatoes were planted on new land the resulting product would be free from disease.

Irrigation tracts recently opened up in Southern Idaho have rendered cultivable large regions in every sense new. However, from the beginning of potato growing in the district diseases have appeared each year, and it was mutually assumed that these diseases had been introduced with the seed planted. The diseases most prevalent are wilt (*Fusarium oxysporum* Schlecht), blackrot *F. radicola* Wollenw Jelly-end rot (*Fusarium* sp.), Rhizoctonia or russet scab, powdery dry rot (*F. trichothecioides* Wollenw) and common scab.

The author experimented by planting clean seed potatoes on absolutely new land and on land previously cultivated to oats and lucerne. In the absolutely new land several diseases appeared in the following proportions: *Actinomyces chromogenus*, 9.3 per cent; *Rhizoctonia* 11.6 per cent; *Fusarium* spp. 5.6 per cent; vascular infections 29.3. In the land previously cultivated to oats and lucerne there were observed common scab 4.7 per cent, *Rhizoctonia* or russet scab 2.8 per cent, *Fusarium* spp., less than $\frac{1}{2}$ of 1 per cent and vascular infection 26 per cent.

From the results so far obtained from the experiments the following conclusions are drawn:

(1) Planting clean, seed potatoes on new land does not guarantee a disease-free product.

(2) A smaller percentage of disease may appear in the product when clean seed is planted on lucerne or grain land than when similar seed is planted on virgin or raw desert land.

1333—A Few Diseases of Fodder Grass in Natal.—VAN DER BIJL, A., in the *Agricultural Journal and Small Holder of South Africa*, Vol. IV, No. 20, pp. 37-39. Johannesburg, 1916.

1336—Researches on the Blight of Plants, Especially of the Brassicæ.—KYROPOULES P., in *Centralblatt für Bacteriologie, Parasitenkunde und Infektionskrankheiten*, Vol. 45, Nos. 6-12, pp. 224-256. Jena, 1916.

1339—*Xanthium Canadense*, a New Weed in Southern Australia.—The Journal of the Department of Agriculture of South Australia, Vol. XIX, No. 10, pp. 898-900. Adelaide, 1916.

1340—*Echium Vulgare* and *Phytolacca Octandra*, Weeds in New Zealand.—ATKINSON, EDMOND, in *New Zealand Department of Agriculture, Industries and Commerce. The Journal of Agriculture*, Vol. XII, No. 5, pp. 381-385. Wellington 1916.

Description of: (1) viper's bugloss (*echium vulgare* L.) widely distributed throughout New Zealand, and especially abundant in the province of Marlborough. It is an aggressive weed of pastures, particularly when the soil is loose and dry; cattle refuse to eat it. (2) Inkweed (*phytolacca octandra* L.) particularly abundant in the north. It is one of the most conspicuous weeds of the Auckland Province. The plant is introduced into new localities by birds.

INJURIOUS INSECTS

1350—Enemies of the Grape in Ontario.—CEASAR L. and HOWITT J. E., in *Ontario Department of Agriculture, Fruit Branch, Bulletin* 237, pp. 39-48. Toronto, 1916.

The first of the two authors treats of insects attacking grapes in Ontario, describing them briefly and indicating the appropriate means of combatting them.

The second author deals with grape diseases in the province. Nearly all diseases of the grape are found in Ontario vineyards, but fortunately it is very seldom that any

disease causes serious loss over any large area of the grape growing districts. However in the past there have been severe epidemics of black rot and frequent local outbreaks of downy and powdery mildew.

1351—Invasion of Field Mice and the Natural Causes of their Sudden Disappearance in the District of Ouman, Russia.—ROSSIKON, K. W., in *The Agricultural Gazette*, Nos. 31, 32, 33, 35. Petrograd, 1916.

AGRICULTURAL TRAINING FOR PARTIALLY DISABLED BELGIAN SOLDIERS

In organizing technical training for the seriously wounded the Belgian government has acted on the principle that an injured man should, whenever possible, not run the risk of becoming a dead weight on the resources of his country, but should still be an appraisable asset, even—in some cases—an element of prosperity. It has therefore been decided to compel the partially disabled to undergo a technical training, suited to the nature of their injuries, the trade they have previously followed, and the tastes and aptitudes which may be discovered in them.

In August, 1915, the work of installing the Belgian Military Institute for the Technical Training of the Seriously Wounded on the land of Notre-Dame-de-la-Mère, $4\frac{1}{2}$ miles from Vernon (Eure), was begun.

Huts which can be taken to pieces and are of uniform pattern are distributed in three rows separated by well metalled roads. They cover an area of 4 acres and accommodate more than 1,200 men, including the permanent staff of the school. The number accommodated will be raised to 2,000.

The work necessitates a variety of plant and of labour: for the roads which have to be made a quarry has been opened, and its stone is transported by a Decauville way; land containing too much clay has had to be rendered sanitary; a system of electricity seventy kilometres long, has been established to give light to 1,400 lamps and to feed thirty motor-engines in the various workshops, furnishing altogether 158 horsepower.

The site of the Institute, in the centre of a forest of 875 acres made it possible to make a bargain with the owner for the purchase of the underwood, in the interests of heating, as well as most of the forest trees. There has ensued real forestry enterprise with the accompanying industry and machinery, and considerable quantities of stakes have been secured.

Forty-eight different trades are taught, each by a practical workman and demonstrators. In addition to the practical work two hours a day are devoted to courses and technical explanations, given by specialists who, like the overseers, are themselves soldiers, oftenest unfit for service by reason of wounds or their health.

Among the trades taught which are connected with agriculture are carter's work, smith's work, the mending of agri-

cultural machines, harness-making, basket-making, the making of packing-cases.

Some acres of uncultivated and clayey land have been given up to vegetable growing on a large scale, and it has been necessary to dig, drain and clean these. Heavy manuring and numerous agricultural expedients have produced good returns. A vast kitchen-garden has also been formed, its beds bordered by ready-grown fruit-trees.

Outside the central premises of the Institute, in which only some hectares of land admit of cultivation, a farm of some twenty hectares at a short distance has been rented; and there the scientific succession of crops, which plays so large a part in kitchen-gardening, is practised, and some good meadows allow a certain number of carefully selected milch-cows to be kept.

The average number of wounded men undergoing agricultural or horticultural training is seventy. They are given experience, successively and in order, of all forms of indoor and outdoor work. They are especially trained to prepare and pack vegetables, which are produced largely above the needs of the establishment. At the end of August, 1916, the growing vegetables were valued at some \$7,600.

The training given in keeping regular accounts should be noted; for it is of capital importance to each of the trades taught in the Institute, where the whole industrial enterprise aims at the sale of products, manufactured and other.

Every wounded man receives 0.05 franc per working hour from the time of his arrival, by way of encouragement. Each trade is however divided into an apprenticeship and a productive section, and when a man is fit to pass into the latter his wages increase progressively until they reach or even surpass the level of those of uninjured workmen in the same trade. "These productive sections," says the technical director in his report, "have brought in more than \$124,000 for manufactured articles. The importance of keeping accounts can be estimated when it is stated that the turnover for the past year was \$190,000."

Finally we note that an agricultural orphanage has just been established, in which orphans of the war will enjoy conditions analogous to those of the partially disabled men, receiving a practical and technical agricultural training.

DEPARTMENT FOR CIVIL AND MILITARY VEGETABLE GARDENS IN FRANCE

This department was recently set up within the Ministry of Agriculture, united to the Ministry of War, and was placed under the direction of R. Maxime Ducroq, president of the enterprise for workmen's gardens at Lille. Its chief object is to provoke and encourage the formation of vast vegetable gardens on the abandoned lands:

(1) By means of the depots of army crops and their sections, the sentry-posts of territorials guarding roads and communications, and the hospitals and other military establishments, in which men are retained by their duties and whence they cannot be sent away on leave or for agricultural employment, but where none the less they dispose daily of some hours of leisure;

(2) By means of the civil population of large towns and the neighbourhoods of these.

In 1916, 5,622 military vegetable gardens having an approximate total area of 5,000 acres and able to yield about \$2,600,000 a year were formed by these means.

In order largely to develop this first success, a staff of seventy mobilized men has been instructed at the Ministry of Agriculture and has been commissioned to go through all France, encouraging by lectures, advice and other measures the gardening by depots; and it is hoped that the existing number of gardens will thus be multiplied by five or even ten in 1917.

Besides vegetable gardens it was recommended that military piggeries should be instituted, in order to utilize greasy water and other waste food. Almost all the depots now keep pigs in this way, and some of them constantly have in their sites about a hundred pigs, the meat of which does not cost them more than 11 cents a pound.

The civil vegetable-gardens have also acquired a considerable importance. Nine recently formed committees share the task of cultivating the lands attached to the fortifications of Paris in which 3,500 gardens have been established. But the number of applications is much above this figure, and the project was conceived of causing some of the abandoned lands in the neighbourhood of the city to be cultivated by the population of Paris. A meeting of the mayors of the communes of the department of Seine was therefore held at the Ministry of Agriculture on 22nd February, 1917, and was followed by the formation of several local organizing committees. Already analogous committees have been formed in a certain number of these com-

munes to distribute their uncultivated lands among their inhabitants. One of them has distributed 300 gardens, of 300 square metres each, to as many necessitous families.

The movement is spreading to the large provincial towns. Some of them have resumed on a far larger scale the culture which they undertook in 1916 at the expense of the municipality, and they have without exception obtained the best results.

Further by the despatches of 30th December, 1916 and 19th January, 1917, the Minister of War decreed that a certain number of mobilized men should in each district be commissioned for three months in the year to provoke and encourage the formation and development of military vegetable gardens.

These mobilized men went through a course at the Ministry of Agriculture which ended on 4th February, 1917, and then departed to their districts where most of them at once began work.

Since the despatches mentioned were variously interpreted, in some districts the minister specified their intention as follows:

(1) Each of the men concerned, except such as have been noted as unsuitable by the Ministry of Agriculture and therefore replaced, should receive as soon as he reaches his district, from the general commanding it, an order allowing him to go and come freely within its limits. The three months for which he is commissioned start on the day on which this order is remitted to him.

(2) From the date on which this order is remitted to him the lecturer is under the orders only of the general or generals to whose subdivisions he has been assigned, is in direct correspondence with them, and addresses his reports to them directly.

(3) For the time for which he is commissioned the lecturer must not be expected to render other service.

(4) In every place lectures must be delivered to the chiefs of united units and not to each unit separately, and must precede the visits to the various military formations.

(5) With a view to these visits a lecturer is supplied without delay with a complete list of the military units, detachments and establishments within the district assigned to him.

In virtue of a decision of the Minister of War on 18th February, 1917, the head of the Department of Civil and Military Vegetable Gardens at the Ministry of

Agriculture has been entrusted with the local control of the execution of instructions applicable to military vegetable gardens, the verification of results obtained,

and the superintendence of the military lecturers commissioned for the relevant work of propaganda.

SETTLING DISCHARGED SOLDIERS ON THE LAND IN NEW ZEALAND

In New Zealand the problem of helping the discharged soldier over the period of transition from military to civil life has been attacked with commendable promptness and thoroughness. At the outset, owing to the novelty of the work and the necessity of improvising the entire machinery, many difficulties had to be faced. The Discharged Soldiers' Information Department, the department of State specially formed to deal with the matter, has however surmounted most of these difficulties and the work is now organized on a satisfactory basis.

According to the first report of the department, which was issued in May, its procedure is, briefly, as follows. The names, addresses and other general particulars as to returning soldiers are collected before the transports reach the landing ports and are registered on cards. The cards are then sorted according to the various districts and a confidential schedule is sent to a local committee. When the soldier is eventually discharged from military service he is interviewed by an officer of the department who reports any particulars which are likely to be of use in finding him employment. With the assistance of the local committee a determined effort is then made to secure employment for those who require it.

The employment of soldiers on the land naturally forms an important part of the work of the department. To meet the case of soldiers who have had no experience in farming, arrangements have been made with the Department of Agriculture to undertake the training of a limited number of men on the various State farms in general farming, dairy farming, fruit farming, poultry and bee-keeping, etc. It was thought that partially disabled men in receipt of pensions might reasonably be expected to desire to take up small sections under the land settlement scheme, for the purpose of poultry raising and other light branches of farm work, and that in these cases a course of practical instruction would often save loss of time and money and consequent discouragement. Up to the present time the opportunities afforded have not been taken advantage of, the men—almost without exception—desiring employment of an immediately remunerative character.

State assistance to New Zealand soldiers wishing to settle on the land is however by

no means confined to courses of instruction. By an Act passed in October, 1915, and entitled the Discharged Soldiers' Settlement Act, 1915, a discharged soldier is given a number of advantages. Under this Act land may be taken up in two ways. Crown or settlement land may be set apart for selection *only* by discharged soldiers, or it may be disposed of to them under special conditions. In either case the Department of Lands is empowered to remit—wholly or in part and for such periods as it thinks fit—any rent payable by a discharged soldier, or may postpone the date for the payment of the rent. When held under special conditions the soldier may receive financial assistance to enable him to bring his farm into such a state that he can make a living from it.

Land may be disposed of to discharged soldiers either by way of sale or by lease. When sold the price is fixed by the Land Board. If disposed of on terms of deferred payment the purchaser has to pay a deposit of 5 per cent of the purchase money, the balance being paid in equal annual instalments with interest at 5 per cent. When let the term may be up to sixty-six years with a perpetual right of renewal for further successive terms. The rent will be determined by the board and is not in any case to be more than $4\frac{1}{2}$ per cent of the capital value of the land. The lessee may at any time during the continuance of the lease acquire the fee simple of the land.

Under section 6 the Minister of Lands may assist an applicant in the clearing, fencing and general improvement of the land, the erection of buildings, and the purchase of implements, stock, seed, trees and any other things which may be deemed necessary for the successful occupation of the land. The rate of interest is to be fixed by the minister, but in cases of hardship he has power to dispense wholly or in part with the payment of interest. The total of the advances made to one person is not to exceed £500. No land let or sold to a discharged soldier under the Act can be transferred until the expiry of ten years from the date of the sale or the beginning of the lease.

According to the first report on the working of the Act 500,000 acres of land have been provisionally set apart for discharged soldiers. Of this area 67,855 acres have formally been proclaimed under the

Act. It has been decided to cut up some blocks of land into suitable sections and, before finally settling soldiers on them, to effect such improvements as will enable selectors to make a living off their sections.

As far as possible soldiers will be employed in effecting these improvements. For fruit farming it has been decided to plant areas with fruit trees, particularly apples.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the March number of the International Review of Agricultural Economics. Persons interested

in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

	Page
The General Raiffeisen Federation in Germany, 1914-15.....	1- 10
Co-operative Oil Mills in Dalmatia.....	11- 16
Recent Successes of Agricultural Co-operation in Canada.....	17- 24
State Bank of Insurance and Insurance against Hail in Uruguay.....	26- 42
Mutual Insurance of Live Stock for Butchery in Italy.....	47- 50
Credit for Colonization in Algeria.....	57- 62
Scheme for Organization of Rural Mortgage Credit in Manitoba, Saskatchewan and Alberta.....	63- 67
Agrarian Taxes in Bosnia and Herzegovina.....	75- 85
Agriculture and the War in Great Britain.....	86- 93
Land Tenure and Colonization in Italian Somaliland.....	94-115

AGRICULTURAL STATISTICS

FOREIGN CROP CONDITIONS

THE June number of the Bulletin of Agricultural Statistics gives details of crop conditions on the first of June. In France the weather greatly improved during May and vegetation had almost made up for lost time which had during the earlier months rendered it so backward, and growth was rapid. Increased warmth and rains of the latter half of May in Great Britain and Ireland greatly improved the prospects of all crops. The outlook for wheat, however, could only be described as moderate. The area under wheat in England and Wales is about 8 per cent. less than last year's, and that under oats is about 9 per cent greater. In Italy the weather in May was very favourable for the crops. The weather in Holland was very dry during May and on the first of June the condition of winter wheat was bad to average, rye was average to good, barley bad to average, and the oat crop was developing well. In Switzerland winter crops were below average and spring crops normal.

According to the July crop report of the United States Department of Agriculture, the indicated production of wheat in that country is 678,000,000 bushels compared with 639,886,000 in 1916. The preliminary estimates for other crops are: barley 214,000,000 bushels against 181,000,000 last year; potatoes 452,000,000 against 285,000,000; corn 3,124,000,000 against 2,583,241,000, and flaxseed 17,000,000 against 15,500,000.

Broomhall's latest crop cable issued July 17th is as follows:

Russia.—Weather is clear and warm and in parts intensely hot, and crops are suffering from dryness. The outlook for winter crop is fair, and spring moderate. Interior movement of grain light, and port stocks practically nothing.

France.—Weather fine, being mostly clear and warm. Harvesting is progressing favourably in the South. In the north dryness prevails, but not to any great extent. Local offers are light and mills operating slowly. Foreign arrivals of wheat liberal, and flour increasing.

Scandinavian Peninsula.—Crop promises small as winter was bad and spring cool and wet. Scarcity of supplies is pronounced and import needs large. Prices very high.

Germany.—All neutral advices and otherwise confirm an unfavourable crop outlook for wheat and oats, owing to heavy winter freezing and spring coldness, with heavy moisture. A yield 40 per cent of normal is frequently heard.

Balkan States.—Harvesting is progressing, and generally speaking from advices as confirmed crops are turning out well. Bulgaria and Roumania are shipping new wheat overland.

Italy.—Parts wet and other parts dry. Harvesting is late, as weather is unfavourable and labour scarce. Estimates point to a moderate yield of fair quality. Importation is slow and needs are urgent.

United Kingdom.—Weather fine; some reports of dryness. Outlook for wheat moderate and other vegetation excellent. Import arrivals of wheat liberal.

India.—Weather favourable with recent monsoon generous. Native food grain abundant. Movement of wheat good and shipment liberal.

Australia.—Crop outlook fair and weather more favourable. Wheat movement liberal and stocks large.

North Africa.—Harvesting Prospects fair.

Spain.—Crops benefitted by recent rains. Harvesting is progressing in the south, and fair yield expected. Stocks light.

PRODUCTION, TRADE AND CONSUMPTION OF OATS, BARLEY AND RYE IN CERTAIN COUNTRIES FOR THE YEARS 1916-17 COMPARED WITH THE FIVE YEAR PERIOD BEFORE THE WAR

(Data abstracted from the "Statistical Notes" of the International Institute of Agriculture, March, 1917).

THE accompanying tables I to VI show separately, on the one hand the consumptive requirements of the importing countries, and on the other the quantities it is estimated can be spared for export to supply these requirements. In each case the data for 1916-17 are compared with the corresponding data for the five-year period immediately preceding the war, namely 1909-10 to 1913-14.

The grain carried over from the crop of 1915 remaining as a surplus on August 1, 1916, is not given for all the countries and especially the importing countries. In this case it is not of great importance, but the carry-over of the exporting countries for the record crops of 1915 has been so large that it effectively influences the situation and these exportable surpluses are shown in the tables.

Oats.—The Institute bases its calculations on a normal increase of population, and consequently estimates normal consumption for 1916-17 at figures in some cases considerably higher than the average consumption for the pre-war period. This basis is probably reliable for the United States but not for Canada, owing to war conditions which have had the effect of decreasing the population or maintaining it at an equilibrium, whereas the Institute estimated it for 1916 at 8,368,000. In Canada, assuming a human population of 8,000,000 inhabitants, with the number of horses approximately 3,000,000, the normal consumption in 1916 would probably be about 320,000,000 bushels, and there would be a surplus for export and carry-over of 107,986,000 bushels. The Institute estimates 22,000,000 bushels for export. As a matter of fact, for the 11 months August 1, 1916, to July 1, 1917, Canada exported 50,000,000 bushels. Assuming the exports for July will equal those for June, namely 7,000,000 bushels, we shall have for the full year a total of

57,000,000, leaving a balance for carry-over into the new grain year beginning August 1, 1917, of 50,000,000 bushels.

The corresponding amount for the United States, 1,148,128,000 bushels, estimated by the Institute as normal consumption for 1916-17 is probably rather under than over the reality. That total would leave a balance for export and carry-over of 341,000,000 bushels. It appears from the official figures that the exports for the 11 months have only amounted to 78,000,000 bushels, which would leave the large amount of 263,000,000 bushels as carry-over.

The quantities of oats, therefore, available for export (Table II) are more than sufficient to supply the needs of the importing countries (Table I). It is, however, to be borne in mind that the comparatively shorter and cheaper North Atlantic route favours the shipment of grain from this continent. Moreover, in the present calculations neither does the Institute nor do we take into account the requirements of countries outside of Europe which in normal years are considerable.

Barley.—(Tables III and IV). Here the European requirements of 76,000,000 bushels can only be met by this continent to the extent of 37,318,000 bushels. The brewing industry has been so drastically curtailed that the requirements, except for human food, are really under the amount estimated by the Institute. It is not unlikely that, in consequence of the new milling regulations in Great Britain and France a certain amount of barley flour is used with wheat flour.

Rye.—(Tables V and VI). The European deficiency of 47,992,000 bushels can only be met on this side of the Atlantic to the extent of 18,000,000 bushels. As rye is used for bread this deficiency tends to increase the demand for wheat.

TABLE I.

OATS—IMPORTING COUNTRIES

COUNTRIES	1916-17				1909-13	
	Crop of 1916	Carry-over on August 1st 1916	Estimated total normal consumption	Deficiency of available quantities	Average production for five years 1909-13	Average surplus of imports over exports 1909-10 to 1913-14
Denmark	Bushels. 48,631,000	Bushels. .	Bushels. 53,773,000	Bushels. 5,142,000	Bushels. 50,343,000	Bushels. 54,636,000
France	267,667,000	.	339,739,000	72,072,000	334,383,000	362,472,000
Great Britain and Ireland	196,231,000	.	253,934,000	57,703,000	194,435,000	256,884,000
Italy	24,543,000	14,148,000	46,997,000	8,306,000	34,775,000	42,446,000
Norway	11,574,000	.	11,769,000	195,000	11,237,000	11,872,000
Netherlands	20,931,000	.	26,047,000	5,116,000	18,992,000	26,611,000
Switzerland	6,248,000	.	14,492,000	8,144,000	4,500,000	16,230,000
Totals	575,925,000	14,148,000	746,751,000	156,678,000	648,665,000	771,151,000

TABLE II.

OATS—EXPORTING COUNTRIES

COUNTRIES.	1916-17				1909-13	
	Carry-over August 1st 1916	Crop 1916	Estimated total normal consumption 1916-17	Surplus for export	Average yield during five years 1909-13	Average surplus of exports over imports 1909-10 to 1913-14
Canada	Bushels. 76,812,000	Bushels. 351,174,000	Bushels. 405,430,000	Bushels. 22,556,000	Bushels. 326,245,000	Bushels. 15,478,000
United States	237,490,000	1,251,992,000	1,148,128,000	341,354,000	1,064,638,000	4,182,000
Argentina (a)	6,244,000	29,912,000	14,233,000	21,923,000	51,063,000	39,093,000
Australia (a)	2,522,000	19,530,000	15,990,000	6,062,000	16,308,000	.....
Totals	323,068,000	1,652,608,000	1,583,781,000	391,895,000	1,458,254,000	1,399,501,000

(a) For the countries of the Southern Hemisphere the crops are for 1916-17 and the grain year is the calendar year 1917, the carry over being estimated for January 1st, 1917.

BARLEY
IMPORTING COUNTRIES

TABLE III.

COUNTRIES	1916-17			Five year average 1909-13.		
	Crop of 1916	Estimated total normal consumption	Deficiency of available quantities	Average production for five years 1909-13	Average surplus of imports over exports 1910-11 to 1913-14	Average consumption 1910-11 to 1913-14
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Denmark.....	22,481,000	26,047,000	1,566,000	24,944,000	129,000	25,073,000
France.....	39,403,000	50,385,000	10,982,000	48,185,000	6,063,000	54,248,000
Great Britain and Ireland.....	55,409,000	107,190,000	51,781,000	65,339,000	47,061,000	112,400,000
Italy.....	10,109,000	10,541,000	432,000	10,105,000	818,000	10,923,000
Norway.....	3,486,000	6,582,000	3,096,000	3,018,000	4,547,000	7,565,000
Netherlands.....	2,499,000	11,161,000	8,662,000	3,261,000	11,065,000	14,326,000
Total.....	135,387,000	211,906,000	76,519,000	154,852,000	69,683,000	224,535,000

BARLEY
EXPORTING COUNTRIES

TABLE IV.

COUNTRIES	1916-17				Five year average 1909-13.	
	Carry-over August 1st 1916	Crop 1916	Estimate for export 1916-17	Average yield 1909-13	Average surplus for export 1909-10 to 1913-14	Average consumption 1909-10 to 1913-14
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Canada.....	9,094,000	41,318,000	13,136,000	42,742,000	5,466,000	37,276,000
United States (a).....	16,764,000	181,000,000	24,182,000	181,877,000	8,295,000	173,582,000

(a) Normal consumption for the United States based on estimated increase of population 186,075,000 bushels; this would leave for export 11,689,000 bushels. Owing to the war the same basis could not be safely used for Canada.

Actual net exports from Canada first 11 months 1916-17: 7,725,566 bushels.

Actual exports from the United States first 11 months 1916-17: 15,783,854 bushels.

RYE
IMPORTING COUNTRIES

TABLE V.

COUNTRIES	1916-17				1909-13	
	Crop of 1916	Estimated total normal consumption	Deficiency of available quantities	Average production for five years 1909-13	Average surplus of exports ever 1910-11 to 1913-14	Average consumption 1910-11 to 1913-14
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Denmark.....	10,787,000	22,117,000	11,330,000	17,775,000	8,193,000	25,988,000
France.....	35,888,000	46,306,000	10,418,000	49,025,000	3,197,000	52,222,000
Italy.....	5,342,000	5,736,000	394,000	5,330,000	618,000	5,948,000
Norway.....	728,000	10,421,000	9,693,000	972,000	10,311,000	11,283,000
Netherlands.....	12,393,000	23,747,000	11,354,000	16,176,000	11,543,000	27,719,000
Sweden.....	22,948,000	27,751,000	4,803,000	23,129,000	3,807,000	26,936,000
Totals.....	88,086,000	136,078,000	47,992,000	112,407,000	37,669,000	150,076,000

RYE.
EXPORTING COUNTRIES

TABLE VI.

COUNTRIES	Carry-over August 1st 1916	Crop 1916	Estimate for export 1916-17	Average yield 1909-13	Average surplus for export 1909-10 to 1913-14	Average consumption 1909-10 to 1913-14
	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.	Bushels.
Canada.....	.....	2,896,000	707,000	2,189,000	.....	2,189,000
United States.....	(a) 3,933,000	47,383,000	17,341,000	34,916,000	..... 941,000	33,975,000

(a) Normal consumption for the United States based on estimated increase of population 36,030,000 bushels. This would leave for export 15,286,000. Owing to the war the same basis could not be safely used for Canada.

Actual net exports from Canada first 11 months 1916-17: 1,038,450 bushels.

Actual exports from the United States first 11 months 1916-17: 12,580,182 bushels.

IMPORTS OF CEREALS INTO BELGIUM

THE Commission for Relief in Belgium has supplied the Institute with statistics of the importation of grain and flour into Belgium during November and December 1914 and through-

out 1915 and 1916. These returns include all the importations of the cereals mentioned for the whole period covered. The surplus of imports over exports during 1913 are added for reference.

Products	1913 (Jan. 1st to Dec. 31)	1914 Nov. & Dec.	1915 (Jan. 1st to Dec. 31)	1916 (Jan. 1st to Dec. 31)
	Bushels.	Bushels.	Bushels.	Bushels.
Wheat.....	56,638,000	1,274,000	16,083,000	23,538,000
Wheat flour.	(1)	272,000	1,311,000	35,000
Rye.....	5,699,000			
Barley.....	14,724,000		11,000	176,000
Oats.....	8,924,000			
Corn.....	19,411,000	28,000	6,897,000	3,400,000
Rice (cleaned)	40,230,000	9,295,000	104,614,000	133,256,000

(1) Surplus of exports over imports 610,000 barrels.

CABLED CROP REPORT

A cablegram received July 23rd from the International Institute of Agriculture gives the following official data concerning the growing crops.

Crop conditions on July 1st were for wheat good in Spain, average in Italy and Switzerland, mediocre in Denmark, Great Britain and Sweden. The condition of rye was good in Spain and Ireland, average in Italy and Switzerland, and mediocre in Denmark and Sweden. The condition of barley was good in Spain, Scotland and Ireland, average in England and Wales, Italy and Switzerland, and mediocre in Denmark and Sweden. The condition of oats was good in Spain, average in Scotland Ireland, Italy and Switzerland, and medi-

ocre in Denmark, England and Wales, and Sweden. Corn conditions were good in Spain, Italy and Switzerland, and the condition of the rice crop was good in Spain, Italy and Japan.

The production of the different crops in Spain is wheat 141,000,000 bushels or 92.6% of the 1916 crop and 112.6% of the average of the five years 1911-15; rye 27,778,000 bushels or 96.3% of last year and 110.5% of the five year average; barley 76,495,000 bushels or 88% of last year and 103% of the five year average.

The cotton crop of India is estimated at 3,423,000 bales of 500 lbs., or 114% of last year's crop and 99% of the five year average.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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CONTENTS

The Preservation of Food.....	PAGE 751
-------------------------------	-------------

PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
The Poultry Division:	
Economy of the Pullet.....	752
The Dairy and Cold Storage Branch:—	
The Cheese Commission..	754
The Entomological Branch:—	
Shade Trees and Forest Insects in Manitoba, by J. M. Swaine.....	755
The Fruit Branch:—	
Fruit Distribution, by F. H. Grindley.	763
The Health of Animals Branch:—	
Hemorrhagic Septicemia of Cattle, by A. E. Moore.....	764
The Live Stock Branch:—	
Canadian Bankers' Competition.....	766
Dominion Department of Agriculture Honour Roll..	767

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Home Canning of Fruits and Vegetables:—	
Prince Edward Island, by Miss Hazel L. Sterns	768
Nova Scotia, by Miss Jennie A. Fraser	768
Nova Scotia, by L. A. De Wolfe.....	769
New Brunswick, by Miss Hazel E. Winters	770
Home Efficiency Club of New Brunswick, by Plarock Fletcher	772
MacDonald College, by Miss Katharine A. Fisher	774
Ontario, by Geo. A. Putnam	774
Manitoba, by S. T. Newton.....	775
Saskatchewan, by Miss Abbie De Lury.....	777
British Columbia, by Wm. E. Scott.....	777
Efforts to Popularize Canning, by John Kyle.....	778
Gardening and Canning Competitions for Girls, by L. H. Newman.....	779
Prince Edward Island:—	
O. P. V. Ensilage, by W. J. Reid, B.S.A.....	780
Nova Scotia:—	
Three Varieties of Apples Originated in Nova Scotia, by P. J. Shaw.....	781
Quebec:—	
Agricultural Equipment for Schools, by Jean-Charles Magnan.....	781
Agricultural Employment Bureau	782
Demonstration Field.....	782
Fruit Trees.....	782
Fruit Crops.....	782
Young Women's Clubs.....	783
Quebec House-Keepers' League, The.....	783
Ontario:—	
Kemptonville Agricultural School Principal.....	783
Co-Operative Movement, in Counties, The.....	784
Campaign of Advertising.....	788
Short Cuts for Increased Farm Revenues.....	790

Manitoba:—	
Dairying Improvement Effort in North-Western Manitoba.....	791
Equipment for Demonstration Work.....	792
Saskatchewan:—	
Activities of the Department of Agriculture:—	
Brand Allotments Increasing	794
Winter Rye.....	794
College of Agriculture Excursions	794
Exhibit at Regina Exhibition	795
Destruction of Gophers, by M. P. Tullis	796
Better Farming Train, by W. W. Thomson.	797

PART III

RURAL SCIENCE

Nursery Stock for School Planting:—	
Nova Scotia, by L. A. De Wolfe	802
New Brunswick, by R. P. Steeves	802
Ontario, by J. B. Dandeno.	803
Manitoba, by R. Fletcher	804
Manitoba, by B. J. Hales	804
Saskatchewan, by A. W. Cocks	805
Alberta, by Jas. C. Millar.	806
British Columbia:	
A Provincial School's Nursery, by J. W. Gibson	806
Ontario:—	
School for Rural Leadership	810
Manitoba:—	
Short Course for Rural Ministers	811

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Associations and Societies --	
The Western Canada Irrigation Association, by Robert J. C. Stead	814
Canadian Seed Growers' Association, 13th Annual Meeting, by L. H. Newman.	815
Canning and Drying Fruit and Vegetables Demonstration	817
British Empire Relief of the Allies Fund, The	817
New Publications	818
Notes.....	819
Index to Periodical Literature	820

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence.	821
Science and Practice of Agriculture	821
Crops and Cultivation	824
Live Stock and Breeding.	827
Farm Engineering.....	830
Agricultural Industries.....	830
Plant Diseases.....	831
Agricultural Economics.....	833
Women Workers on the Farm in Britain.....	835
Institute Economic Bulletin, Contents of.....	836
Agricultural Statistics:—	
Foreign Crop Conditions.....	836
Documentary Leaflets of the International Institute of Agriculture.	837
The World's Wheat Prospects for the Grain Year 1917-18, by T. K. Doherty	839
World's Production of Wheat.....	840
Prospective Requirements and Supplies.....	841

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THE PRESERVATION OF FOOD

THE country has risen splendidly to the call for production. The duty now devolves upon all the people to make a wise use of the results. Waste in any detail at such a time is little short of a crime. It is an act of treason alike to the country and to all those who, individually and collectively, have responded to the demands that were made of them. This being admitted, it becomes a question how best the many diverse articles of food can be preserved for future use. The solution of that problem involves in certain measure a solution to the even more puzzling problem of the high cost of living. It goes further and means the release of a greater amount of food for the use of our armies in the field.

Cold storage affords one important means to the end in view, but there are other and more intimate ways that appeal to the dwellers alike in city and country. These consist principally of drying, canning, curing and preserving, four methods that can be carried on with almost equal facility, if not on the same scale, in the home as in the factory.

A dominion-wide educational campaign has been carried on in this connection, by the Federal Government through the Food Controller and the Experimental Farm system with the aid of experts, who have been engaged to give demonstrations, and by the provinces through short courses, largely made possible by grants under THE AGRICULTURAL INSTRUCTION ACT, by the circulation of bulletins, pamphlets and circulars, giving advice and instruction as to the best methods to adopt, the utensils required and so on, and with the assistance of municipal councils, boards of trade, horticultural societies, women's institutes and homemakers' clubs. Public meetings have been held, competitions arranged, lectures given and every method of practical teaching employed, all with a common object in view, in the first place to encourage production, in the next conservation, and, finally, the avoidance of waste.

The steps that the provinces have individually taken are set forth in a series of articles in this number of THE AGRICULTURAL GAZETTE by which it will be seen that operations have been conducted on a generous and comprehensive scale and with a degree of earnestness that denotes permanency in beneficial results.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE POULTRY DIVISION

ECONOMY OF THE PULLET

FOR a number of years records have been kept at several poultry plants of the Dominion Experimental Farms System of the egg production of early pullets, late pullets, yearling hens, two-year-old hens and older. These records were kept with the view of arriving at a definite conclusion relative to the influence of age upon the cost of egg production.

Many factors influence the records of the individual pen, climatic conditions being one of the chief. Late

pullets and hens show to better advantage in the milder localities, a fact that can be attributed to the short winter season; but the early hatched pullet has proven to be the most profitable, heaviest, and most economical producer when a general average is taken of all the records.

The following table gives a summary of average results for the past three winters from records of many pens of pullets, yearling hens, two-year-old hens and older:—

AGE	Number of Birds	Average Weight of eggs per Dozen	Average Price per Dozen	Total Value of Eggs	Cost of One Dozen
Early pullets	292	23 2	43 2	\$451 73	18.3c.
Late pullets	152	22.7	43.1	221.88	56 "
Yearling hens	161	24 7	47	176 48	78.2 "
Two years old and over	79	24.2	44	13 94	\$5.73

It would appear from the foregoing that there is considerable loss from late pullets the first winter, and from hens during their second winter laying, though these prove profitable sometimes. It may be well to point out that some of the records were obtained during December, January and February only, a season of low

production for hens, and that a number of hens on the Farms system are kept over their profitable period for special breeding purposes, and the egg yield from these would enter into, and adversely influence, their average.

In considering the average weight per dozen as shown in the foregoing

table, it may be pointed out that although the pullet average is below that of the yearling hen and two-year-old, this is primarily caused by the few exceptionally small eggs that the pullet produces at first, which are sufficient to reduce the general average. In utility breeds, however, pullet eggs soon attain a fair marketable size, so that this slight difference in the weight per dozen eggs cannot

offset her claim to the distinction of being the most profitable bird to keep. The conclusion drawn from the records, and as shown in the table, indicates that for winter egg production the early-hatched pullet is the most profitable, the yearling seldom as profitable, and the late pullet and two-year-old hens and older, with but few exceptions, not at all so.

THE HORTICULTURAL DIVISION

CANNING FRUITS AND VEGETABLES

IN view of the campaign conducted to encourage greater production of food products, especially fruits and vegetables, in the cities and in the vicinity of cities, the Central Experimental Farm is conducting a number of experiments for the purpose of securing data relative to practical home canning and food preservation.

To conduct the practical work, the services of Miss Laura Kirby, a graduate in Domestic Science from Macdonald College, have been obtained. Miss Kirby, in addition to carrying on the experimental work, will give demonstrations in home-canning methods. For this purpose a room in the horticultural building, Central Experimental Farm, has been fitted up, which is open to the public on certain days of each week. The Horticultural Society and the Wo-

men's Canadian Club of Ottawa are also jointly arranging for canning demonstrations, at each of which Miss Kirby will be the demonstrator in charge.

The experiments now under way will include the test of seven different canning outfits. In addition to the experimental work with these outfits, it is proposed to try the canning of fruits and vegetables in water only, without the addition of any preservatives.

Two circulars entitled "Notes on the Drying of Fruits and Vegetables" and "Notes on the Home Canning of Fruits and Vegetables," respectively, have been prepared, and are distributed gratis to people visiting the home-canning room and demonstrations at the Central Experimental Farm.

APPOINTMENTS

MR. C. B. Gooderham, B.S.A., formerly assistant Entomologist, Department of Agriculture, Truro, N.S., has been appointed Assistant Apiarist at the Central Experimental Farm. Mr. Gooderham graduated from the Nova Scotia College of Agriculture in 1915, spent two years as laboratory assistant at Truro, N.S., and graduated from Macdonald College in 1916, specializing in entomology. Since graduation, in addition to his duties

as Assistant Entomologist, he has had charge of the administration of the Foul Brood Act in Nova Scotia and of the College apiary.

Major N. D. MacKenzie has been appointed Assistant to the Superintendent of the Experimental Farm at Brandon, Manitoba.

Major C. B. Nourse has been appointed Assistant to the Superintendent of the Experimental Farm at Indian Head, Saskatchewan.

THE DAIRY AND COLD STORAGE BRANCH

THE CHEESE COMMISSION

IN March last the Imperial Board of Trade intimated a desire to purchase the entire exportable surplus of Canadian cheese for the season of 1917. With that end in view a representative of the Board, in the person of Mr. James McGowan, was sent to Canada, and the Canadian Government was requested to nominate two commissioners to act with Mr. McGowan for the purpose of dealing with the whole question. The Minister of Agriculture nominated Mr. Jas. Alexander, cheese exporter of Montreal, and Mr. J. A. Ruddick, Canadian Dairy and Cold Storage Commissioner, as the Canadian members of the Commission.

The Board of Trade purchased the entire output of New Zealand cheese for the season of 1916-17 at 19c f.o.b. steamer in January last, and was desirous of securing the Canadian output at the same figure. In view of the difference in the market value of Canadian and New Zealand cheese, and the further fact that values in all food products had risen during the interval, it did not seem reasonable that Canadian cheese should be sold at the same price as that paid for New Zealand cheese some months previously.

After negotiation the Board of Trade finally authorized the Commission to offer 21¾c f.o.b. steamer Montreal for the exportable surplus of Canadian cheese for the season of 1917. The Commission, having formulated rules to govern the acceptance of cheese on these terms, laid the whole plan before the cheese trade on June 5th, and all regular dealers were invited to offer cheese in lots of 500 each of a single grade and colour.

The Commission recognizes three

grades of cheese, thus conforming with the regular commercial practice. The dealers are required to purchase the cheese at the country boards, or otherwise, in the same manner as heretofore. The dealer determines the grade of individual shipments from each factory, and supplies the Commission with a list of cheese which he has to offer, stating the grade and quantity. When the cheese are definitely shipped for overseas shipment the inspectors employed by the Commission examine the offerings to see that the quality and quantity agree with the invoices and specifications submitted by the dealer. On delivery to the ship, and presentation of Bills of Lading and other documents, the Commission issues a cheque to the dealer in settlement.

Under this plan the existing organization and facilities for handling the cheese business have been utilized to the full extent. The cheese come to Montreal through the usual channels, the only difference being that the buyers know exactly what they will receive for their weekly receipts and speculation is thus eliminated.

Owing to the exigencies of the shipping situation "through" shipments of cheese from Western Ontario and direct shipments from Prince Edward Island are quite out of the question, and this condition, rather than the rules of the Commission, have made it necessary to have all cheese warehoused in Montreal. That is the only departure from the usual routine of the trade under the purchase of cheese by the Commission. The Commission does not grade the cheese. That responsibility lies with the dealer, who must settle with the

factories as he has done in the past.

It was feared by some, when the plan was first proposed, that the cheese dealers would combine and not pay full value to the factories; but the Commission, knowing the cheese trade, relied upon the competition between the buyers to ensure full value being paid in the country. The results have amply justified this view. As a matter of fact, the prices paid in the country have, in many instances, been too high to permit of any profit after paying inland freight, cartage, ware-

housing, cooperage, etc.

In view of the difficulties of the shipping situation the arrangement for taking delivery of the cheese at Montreal is a very fortunate one for the cheese producers of Canada. If the regular exporters, under the existing conditions, had to take chances on finding sufficient ocean space, the risk involved would be so great as to necessitate a much wider margin than usual between the prices paid in the country and the prices received on delivery in the United Kingdom.

THE ENTOMOLOGICAL BRANCH

SHADE TREE AND FOREST INSECTS IN MANITOBA

BY J. M. SWAINE, ASSISTANT ENTOMOLOGIST FOR FOREST INSECTS

INSECT injuries to our shade and forest trees are so extensive and so serious that the control of injurious insects affecting trees becomes a very important factor in the conservation of these resources. The annual loss in Canada from the ravages of forest and shade tree insects amounts to many millions of dollars. Part of this great loss is beyond any human means of prevention thus far devised; but it is true that many of our most destructive forest insects and practically all of our shade tree insects can be effectively controlled by feasible methods.

We have selected for this discussion only the species that have been most injurious in Manitoba during the last few seasons.

SHADE TREE INSECTS

An examination of our shade trees in any section of the country reveals many serious insect injuries. Boring insects in the bark and wood of the trunk and branches, defoliating insects of many kinds, and sucking insects on the leaves and tender bark combine to check the growth, mar

the beauty and very frequently to kill our finest trees.

Nearly all these insect species are native to this country, and are more or less injurious in the forest. Many of them are seldom found causing any important injury under natural forest conditions, although they are well known and dreaded enemies of shade trees. As a rule each of these insect species feeds upon only a few kinds of trees, and since the number of shade trees available for them in any locality is limited, they concentrate their attack upon a few trees and injure them very seriously. On the other hand, it is more often feasible to control or prevent injuries by insects on shade trees, since the greater value of the individual trees enables us to employ methods of control that could never be used at all under forest conditions.

It seems to be particularly unfortunate that the shade trees of the Prairie Provinces should be so seriously affected by injurious insects. The poplars, willows and Manitoba maples, utilized so widely for shade trees and shelter belts, are particularly subject to attack by insects,

and have been affected with exceptional severity during the last two summers. That they will be troublesome again in 1918 is more than probable, and, even at the risk of a tiresome repetition, it seems desirable to discuss briefly the most serious of these injuries and the most practical means of control.

THE WESTERN WILLOW LEAF-BEETLE,
Galerucella Decora SAY

This injurious species is a small, dark-yellow or brownish beetle, rather flat and about three-sixteenths of an inch in length. Both adults and larvae feed upon the leaves of willows and poplars, stripping off the green surface, more or less completely destroying the foliage, and leaving the trees scorched and brown. Many trees were killed last summer and the summer before in badly-infested districts in the Prairie Provinces, more particularly in Alberta and Saskatchewan, but also in western and southern Manitoba.

The adult beetles appear in the early summer from their hibernating places under the litter beneath the trees upon which they have bred, and feed upon the young willow or poplar foliage.

The dark-coloured eggs are laid in clusters of three to five on foliage of willows or less commonly of poplars. The willow is apparently the favorite food plant of the larvae, although they feed readily upon all poplars except the aspen, upon which they are less commonly found. The larvae are light yellow with a wide dark stripe along the back, a dotted line along the sides, and the head black. The eggs are laid on the leaves and the larvae are present throughout the summer, maturing during the latter part. The young adult beetles feed for some time upon the foliage and go into hibernation beneath the leaves upon the ground. When they occur in enormous numbers, the food supply is soon exhausted and the beetles fly away in an

immense swarm in search of further feeding grounds and breeding places. These swarms of beetles will light upon poplars and willows over which they pass and defoliate the trees in an exceedingly short time. Within a few hours the beetles may pass on to continue their injurious work elsewhere. Eventually the swarms disintegrate, and the beetles spread over the available foliage to lay their eggs for the next brood. It appears certain that these immense swarms originate in extensive areas of willow and poplar scrub, hibernate on the ground beneath the fallen leaves, and, after stripping off the foliage at hand early in the following summer, leave on their destructive "flight."

Control Measures.—The young or grubs and also the adult beetles when they are present in moderate numbers can be effectively controlled by spraying the infested foliage with lead arsenate or with Paris green. When the beetles appear suddenly in very great numbers, these poisons are not always efficient, since the foliage is often destroyed before the poison can be applied and become effective. Some other means must therefore be employed to cause the beetles to cease feeding immediately. This can be done with considerable success by spraying the beetles on the foliage with kerosene emulsion in as strong a mixture as the trees will bear, at the rate of one part of the stock solution to six parts of water. If the trees are jarred or shaken, many beetles will drop to the ground and may be sprayed then with the kerosene emulsion. This will, of course, only affect the insects then upon the trees and those actually wet by the spray. Strong smudges of damp hay and manure, giving off volumes of smoke beneath the trees, have been successful in driving away the swarms, and can be used with advantage in an emergency instead of the kerosene emulsion, until the lead arsenate or Paris green can be applied.

After the main flight of the beetles is over many beetles and frequently the young may be found feeding upon the foliage. Whenever this occurs, or other leaf-feeders, such as the Yellow-spotted Willow Slug, become abundant, lead arsenate or Paris green will hold them in check.

CANKERWORMS

The Fall Cankerworm, *Alsophila pometaria* Harris, has been particularly injurious to Manitoba maples in the provinces of Manitoba and Saskatchewan during recent years. The adults of these small caterpillars are brownish-gray moths about one-half an inch long. The males have thin delicate wings, but the females are wingless and must crawl up the tree trunks to deposit their eggs. When the caterpillars have become full grown they descend to the ground on a thread of silk and bury themselves below the surface. There they change first to the pupa, or resting stage, and later to the adult, or moth. The latter usually appears in the fall, and the wingless females ascend the trunks to deposit their eggs upon the bark of the branches and twigs. The eggs hatch late in April, or in May, and the caterpillars feed upon the foliage for about a month, becoming about an inch in length when full grown. When the caterpillars are very numerous they are able to defoliate the trees entirely and to cause serious injury.

The moth of the Spring Cankerworm, *Paleacrita vernata* Pack., emerges from the ground and deposits its eggs upon the bark in small clusters during the first warm days of early spring. That of the Fall Cankerworm, which is the more abundant and injurious species in Manitoba, emerges from the ground in large numbers during the latter half of October and deposits its eggs upon the bark of branches and twigs in clusters of from 100 to 400. The eggs remain upon the trees during the winter and hatch in the spring.

The cankerworms are slender, greenish, yellowish or blackish caterpillars, about one inch long when full grown, light green below and with one yellow and three narrow white stripes along the sides.

Remedial Measures.—Cankerworms may be controlled either by banding the trees with a sticky substance to prevent the wingless females crawling upon the trunks to deposit their eggs, or by spraying the infested foliage with poison while the caterpillars are small.

Spraying with Arsenates.—The infested trees should be sprayed with Paris green or with lead arsenate as soon as the caterpillars appear so as to poison the latter before they do much injury. After the cankerworms are half grown it is more difficult to kill them with poison.

Lead arsenate is the most satisfactory spray mixture for this purpose. It should be used at the rate of 6 to 10 pounds of the paste in 100 gallons of water; the stronger mixture is used when the caterpillars are more than one-half an inch long.

Paris green may be used instead of the lead arsenate at the rate of one pound mixed in 100 gallons of water. To avoid burning the foliage one pound of freshly slaked lime must be added to the mixture for each pound of Paris green used.

The first application should be made as soon as the caterpillars appear on the leaves, probably early in May. A later spraying may be necessary, particularly if heavy rains follow the first application. Apple trees should be sprayed just before the blossom petals drop. The spray should be carefully applied and all the leaves thoroughly covered.

Banding.—When cankerworms have been abundant in a district and a recurrence of the injury is to be expected the following season, valuable trees may be protected from injury by applying a sticky band about the trunk to prevent the wingless females crawling up to deposit their eggs upon the branches.

A strip of thick wrapping paper is tied about the trunk with two strings five or six feet from the ground, and to this the sticky substance is applied in a complete ring about five inches wide. An excellent sticky mixture is made by boiling together equal parts of resin and castor oil. Even the common sticky fly papers may be used effectively. To be effective the sticky bands must be applied during the second week in October, before the females begin ovipositing, and must be kept fresh until the ground is frozen.

PLANT LICE ON THE MANITOBA MAPLE

The Negundo Plant Louse, *Chaitophorus negundinus* Thos. This small green plant louse is the most persistent and serious enemy of the Manitoba maple in the Prairie Provinces. The insect appears in enormous numbers early in the season and sucks the juice from the foliage, killing many of the younger leaves, deforming many others, and through a copious exudation of a fluid known as honey dew inducing the rapid development of a black sooty fungus, which covers and seriously disfigures the foliage. In bad infestations there is considerable defoliation, especially of the partly developed leaves. Usually the many insect enemies of the pest so reduce its numbers that the trees may develop normally through the latter half of the season.

Control Measures.—Plant lice obtain their food by sucking the plant juices through their slender beaks with which they pierce the tissue. Poison sprays, therefore, are ineffective, and control is obtained by spraying with an insecticide which kills by contact. Such contact insecticides are: kerosene emulsion, fish oil or whale oil soap, and the nicotine extracts. Kerosene emulsion, diluted one to nine, is often most readily obtained, and is entirely effective if thoroughly applied as soon as the insects become numerous. In some seasons, later sprayings are necessary.

A TWIG-BORER OF THE MANITOBA MAPLE

The Negundo Twig-borer, *Proteopteryx willingana* Kearf., is more or less injurious each season to twigs of the Manitoba maple. The injury is caused by the caterpillar of this small moth boring into the young twigs, causing them to develop into elongated hollow galls within which the caterpillar lives and feeds, extruding the excrement through a hole in the side. Many twigs and even small branches may be badly stunted or killed, and when the caterpillars are numerous, the injury, particularly to small trees, is often considerable. The caterpillars become full grown during June, and pupate either in the ground below the trees, or, infrequently, within the galled twigs. The adult moths emerge from the pupal cases during July. The young caterpillars are said to feed upon the leaves for a short time before entering the twigs.

Control Measures.—The only remedy that has been suggested is to collect and burn the infested twigs early in June to check the spread of the injury. This method obviously has a very limited application, but may be employed when the injured trees are small. It is possible that a spray of Paris green or lead arsenate applied about the end of June would destroy many of the young caterpillars.

THE SPRUCE SAWFLY, *Lophyrus abietis* Harr.

The caterpillar-like larva of this sawfly is not uncommon in Manitoba, feeding upon the needles of cultivated spruces. The trees are sometimes almost entirely defoliated by them. The larvae are readily killed by spraying the infested foliage with lead arsenate or Paris green.

SPRAYING SHADE TREES

For the application of sprays a spray pump of some sort is, of course, necessary. A power sprayer is

needed to cover very high trees, but for most trees of the prairies a spray pump of almost any sort, fitted with proper hose and an extension nozzle will do very effective work. A barrel pump, or even the half barrel size, will spray small trees, and even the very cheap bucket-pumps and knap-sack sprayers may be used with astonishing effect. These spray pumps can be obtained through the local seedsmen or hardware merchants. Such a method of protection can, of course, be profitably applied only to ornamental and shade trees, and to wind breaks, valuable enough to warrant the expenditure of a few cents per tree.

Lead Arsenate.—Leaf-feeding insects of all kinds are usually best controlled by poison sprays. Lead arsenate is one of the best of these for use on shade trees; its initial cost is somewhat higher, but it adheres to the foliage longer, and does not often burn the leaves when used at the ordinary strength. It is usually sold in the form of a paste, and should be worked up in a small amount of water before being diluted. For general spraying against leaf-feeding insects, two pounds are mixed with 40 gallons of water; but for bad infestations of cankerworms, especially when the caterpillars are more than one-half grown, three to five pounds to the barrel of water should be employed.

Lead arsenate is also used in the form of a powder. One pound of the powder will do the work of about two pounds of the paste.

For use in small quantities:—

Lead arsenate, paste . . .	1 tablespoonful
Water	1 gallon

Paris green is used at the rate of four ounces mixed in 40 gallons of water for general spraying against leaf-feeding insects. When a stronger mixture is required, the poison may be increased to five or six ounces in 40 gallons. There must be added at least as much freshly slacked lime as Paris green

to prevent burning the foliage, and the spray mixture must be kept well stirred while spraying is in operation:

Paris green	4-6 ounces
Fresh lime	$\frac{1}{2}$ -1 lb.
Water	40 gallons

For use in small quantities:—

Paris green	1 heaping teaspoonful
Mixed in water	3 gallons
Freshly slaked lime . .	8 ounces

Kerosene or Coal Oil Emulsion is a very effective spray mixture for the control of plant lice, and other sucking insects. It must wet the insects in order to affect them, therefore the application should be thorough.

One half pound of hard soap is shaved fine into one gallon of hot water and stirred until dissolved. Two gallons of kerosene (coal oil) are then added and the mixture immediately churned violently until a thick creamy emulsion is produced. This churning is best done with a bucket pump, putting the nozzle back into the bucket. The stock emulsion which is obtained when the mixture is properly made will keep for months if covered from the air. For use on plant foliage it must be diluted with water at the rate of one part of the stock solution, well mixed, usually in from 9 to 12 parts of soft water.

Stock Emulsion:

Laundry soap	$\frac{1}{2}$ pound
Soft water (hot)	1 gallon
Kerosene (coal oil) . . .	2 gallons

Diluted Spray:

Stock solution	1 gallon
Water	9 to 12 gallons as required

Whale-oil or Fish-oil Soap is used for the same purpose as kerosene emulsion. It may be employed against plant lice at the rate of one pound dissolved in from four to six gallons of water. Its unpleasant odour makes this insecticide less desirable for use on shade trees.

Tobacco Extracts.—Several valuable preparations of nicotine may be obtained from dealers in insecticides. "Nikoteen" and "Black Leaf 40" are among the best of these, and are very effective in controlling plant

lice. Soap should always be added to the diluted spray at the rate of about one pound to forty gallons.

TWO DESTRUCTIVE FOREST INSECTS

There are many injuries by destructive insects in the forested area of Manitoba, but only two of them are selected for this paper. The first, the Larch Sawfly, has spread into the province only recently from Ontario; but it has already killed a considerable amount of timber and the remaining larch is in danger of wholesale destruction. The second injury, by boring grubs in pine and spruce logs and fire-killed trees, ruins a large amount of timber each season, and constitutes one of our most important forest losses.

THE LARCH SAWFLY, *Nematus erichsonii* HARTIG

The larch or tamarack has been very largely killed off throughout many sections of the eastern provinces by this very destructive species, which is now firmly established in the larch areas of Manitoba, and has spread westward into northern Saskatchewan.

The injury is caused by the larvae, known as false caterpillars, feeding upon the larch foliage during the summer. The larvae are greenish in colour with black heads, and have the habit of coiling the body around the needles upon which they are feeding. When they are very numerous the trees are practically defoliated and serious injury results. Larches which have been stripped of their foliage for three years in succession usually succumb, either as a direct result of defoliation or to attack by the Eastern Larch Beetle.

The Larch Sawfly is preyed upon by several species of native parasites, but, unfortunately, they are seldom able to check its activity before the trees have been very seriously injured. The sawfly also occurs in England, but species of small para-

sitic flies, native to that country, are able to hold it fairly well in check. Several years ago the Dominion Entomologist, Dr. Hewitt, imported large quantities of cocoons infested with these valuable parasites from England, and they were distributed in sawfly-infested larch swamps in the Riding Mountain Reserve and in the Spruce Woods Reserve of Manitoba. Last summer it was determined that these beneficial parasites had become established in the Spruce Woods Reserve, and it is hoped that they will eventually become an important factor in controlling the Larch Sawfly in this country.

When this insect attacks cultivated larches it is readily controlled by spraying the foliage with either lead arsenate or Paris green.

BORING GRUBS IN LOGS AND FIRE-KILLED TIMBER

Pine and spruce logs and standing trees killed by fire or bark-beetles or any other cause, are usually very badly injured or ruined by the tunnels of large boring grubs if left unprotected in the woods for two seasons or even for one. The chief injury is caused by large, whitish, legless, boring grubs, the young of very large long-horned beetles, grayish or black in colour, and commonly known as Sawyers.

The beetles fly about in the sunshine and lay their eggs in the slits cut in the bark of dying trees and logs. The young grubs feed upon the inner bark and sapwood for several weeks and then excavate an oval tunnel nearly as large as one's little finger down deep into the wood. The tunnel usually passes across the fibers far in toward or quite to the heart and then out again to the surface. The grub spends two seasons in the wood and changes to the adult beetle, which cuts its way out through the bark about two years after the eggs were laid.

These beetles are very abundant in the forest areas of northern Manitoba and everywhere throughout our eastern coniferous forests.

THE INJURY TO FIRE-KILLED
TIMBER

In timber injured or killed by ground fires in the early season, the destruction of the timber value by these boring grubs is usually complete before the second winter following the fire. If the fire occurs in July the adult beetles will be about the trees in thousands actually before the ground is entirely cooled; and in a very short time the piles of boring dust about the base of the trees, together with the saw-like sound of the thousands of pairs of jaws, betrays the presence of the grubs within the wood.

When the fire occurs late in the season, after the adult beetles have largely dispersed, few eggs can be laid in the dying trees that season, and by the following summer the bark has usually become too dry to attract the egg-laying females; so that timber in late season burns is rarely seriously injured. Also in the hotter parts of the fire, where the bark is badly charred or burned on most of the trunk, no eggs are laid, and consequently the timber is immune. Unfortunately, timber so badly charred very frequently cracks as a result of the rapid drying.

Grub-infested timber on a burn must be logged the first winter following the fire, or earlier, and should be placed in water as soon as possible. The loss caused by these grubs may be partly realized when it is considered that practically all the saw timber on an average burn would be sound and perfect for a generation if it were not for the boring grubs and parasitic wood destroying fungi. As I have said before, the control of ground fires is merely a highly effective method of preventing insect injuries.

Control Measures.—Efforts to prevent injury by these grubs will include: prevention of egg-laying, by densely shading or by watering the logs; destruction of the grubs already in the bark before the wood is injured, by barking the logs or watering them in the early season; and the reduction

of the numbers of the beetles by systematic destruction of their breeding places—in other words, slash-burning.

Of several control methods, tested by us and by others at various times, these are outstanding as effective and feasible; watering the logs early in the season, covering the log piles densely with brush, and barking the logs to be protected.

Floating the Logs.—Logs which must be left in the limits over a season should, if possible, be placed in the water as soon as the ice is gone. If the logs are placed in a loose boom so that there is considerable drift—and therefore the top side of the log is frequently wet—there is rarely any serious injury; but an additional safeguard is found in turning the logs about one month after they have been floated. I have not known logs handled in this way to be seriously injured by borers. If, as rarely occurs, the logs must be made into a close boom, so that there is little or no wave play over the top side of the logs and little rolling of the logs, the turning should not be omitted. Floating the logs is the cheapest and most satisfactory control method when good watering facilities are available.

Barking the Logs.—If the cut, or any part of it, must be left over summer in the woods, the logs can be completely protected by barking them before the middle or end of July. The beetles which appear later will not lay their eggs upon bare wood, and the young grubs from eggs already laid feed for nearly a month on the inner bark and sap wood before boring down below the wood surface, and would therefore be removed with the bark.

Covering Logs with Brush.—If barking the logs is considered too expensive or must be discarded for lack of labour, and water is not available, we believe that the logs can be quite as completely protected by covering them densely with

brush before the men leave the woods, or at least before June 1. The logs should, of course, be piled on skidways, and should receive a very thick and complete covering of green spruce, pine or balsam boughs. The spruce brush makes the densest shade, and should therefore be used when it is easily available. The beetles love the sunlight, and will not enter the dense shade to deposit their eggs in the bark.

Other methods employed in our tests, and recommended by certain lumbermen, gave a varying amount of protection, but none of them for either cheapness of operation or effectiveness in protection could be compared with covering with brush. For instance, crib-piling the logs in the open does not, in our experience, protect effectively the under side of large pine logs, since the under side is only moderately shaded and not effectively dried; spruce logs are apparently fairly well protected by crib-piling, probably because the bark is thinner and dries more rapidly. Scoring along the top side of the log is only partially effective.

SLASH BURNING AS A METHOD OF CONTROL

The borers we have been discussing are always found in slashings, breeding in cull logs, tops and larger branches of the previous two winters' cut. They are apparently attracted long distances by the odour of the injured bark and wood, and it is evident both that the slash serves as a breeding reservoir and that it may be utilized as a trap for the destruction of the beetles. If the slash from extensive cutting is allowed to accumulate from year to year, the beetles will always be present in the limits in great numbers; whereas, if the slash is burned each season, the numbers of the beetles on the limit must be very greatly lessened at least. If the burning is done before the summer following the cut, the breeding-places are destroyed, but the insects themselves are not killed;

while if the coarser slash is piled and left to be burned the following fall or winter, it will be filled with the grubs during the summer and the fire will destroy immense numbers of them. If the limit is isolated the insect control will of course be much more effective than if there are large bodies of neglected slash or recent burns nearby.

In addition to the larger wood borers which have been the subject of our discussion, the slash invariably serves as a breeding ground for countless myriads of other bark and wood boring beetles of many species; and some of these forms, when they become numerous enough, attack and kill green timber, particularly the unthrifty or overmature trees. Slash burning affects these many species as it does the destructive wood borers, and can be made to serve as a trap in the way already described. When we consider the matter solely from the standpoint of insect control, it is beyond all question that the practice is of great value; and I have stated elsewhere that, on a large and valuable limit, handled as a permanent enterprise for use of future generations as well as our own, the benefit derived from insect control will in the long run largely, if not entirely, repay the extra expense involved. That is an indefinite statement, because we have not yet the statistics to prove it, but when we add to the credit side the destruction of fungi and prevention of their development, the removal of the fire hazard and improvement of travel in the limits, the case for slash-burning becomes very strong.

BORERS IN CAMPS

Camps made of unbarked logs are frequently infested by wood-boring grubs. Barking the logs shortly before cutting, of course, prevents any such nuisance. If the logs are to be used in the unbarked condition for building purposes they should be cut in the fall, and piled

loosely off the ground, so that the inner bark may become thoroughly dried before the following July

Building lumber, on which part of the sapwood and bark have been left, is sometimes found to be infested with boring grubs long after the

building has been erected, and the lifetime of the grubs in such dry wood is often extended to an extraordinary degree. Green lumber bearing sapwood and bark should be avoided for building purposes.

THE FRUIT BRANCH

FRUIT DISTRIBUTION

BY F. H. GRINDLEY, B.S.A., ASSISTANT TO THE COMMISSIONER

AT this time of the year the problem confronting fruit growers, and giving them the most concern, is that of marketing. There is a certain quantity of fruit produced every year in Canada, and whether that fruit will be consumed depends upon (1) supply and demand, (2) extent and quality of the crop, (3) prices, and (4) distribution. This year conditions are such that the whole situation rests upon the question of distribution.

At the present time an embargo prevents the export of Canadian apples to Great Britain and Australia. Under normal conditions, and with an average apple crop, Nova Scotia would send 750,000 barrels of apples to Great Britain, Ontario would export one million barrels to the same market, and Australia would receive 70,000 boxes from British Columbia. Anything preventing the movement of fruit through those channels would seem, at first sight, to cause a very serious situation, and one which might well give Canadian fruit producers some concern. Fortunately, however, there is every reason to believe that no difficulty will be experienced in marketing the Canadian apple crop this year.

It so happens that the crop is extremely light in Ontario and Quebec, and, consequently, many large consuming markets which ordinarily look to these provinces for their supply, must seek elsewhere for it.

British Columbia has a fairly good crop, though not as heavy as last year.

All eyes are on Nova Scotia. Early estimates placed the Annapolis Valley crop at one million barrels, and in spite of a very severe wind storm which swept through that section about August 10, there is still every reason to expect that the crop will about equal the reports made some weeks ago. Bearing that in mind, and remembering that the Ontario crop is only 30 per cent of normal, there is a big gap in consuming centres which must be filled by Nova Scotia and British Columbia.

British Columbia will not have enough apples to supply the Prairies, because usually it takes the combined crops of Western Ontario and British Columbia to feed those markets. Nova Scotian apples will, therefore, undoubtedly move west in large quantities.

Then there are the cities of Montreal, Toronto, Ottawa, as well as other cities and towns in Ontario and Quebec which will clamor for apples—ordinarily supplied by Ontario and Quebec. This clamoring must be quietened by Nova Scotia.

In other words, there can be no doubt that the consuming power in Canada is great enough to dispose of our entire available apple crop—if distribution is regular and thorough and systematically governed.

It is no easy matter to move three

thousand or more carloads of apples, and to arrange the distribution of such a large quantity of fruit so that no markets are over-supplied and that all markets receive about their usual quota. But proper organiza-

tion can do it, and with fruit conditions in Canada as they are, there is no reason why the available supply of apples should not be distributed and consumed at home at reasonable prices to all concerned.

THE HEALTH OF ANIMALS BRANCH

HEMORRHAGIC SEPTICEMIA OF CATTLE

BY A. E. MOORE, CHIEF TRAVELLING INSPECTOR

HISTORY

HEMORRHAGIC Septicemia of cattle is a contagious disease, and is due to an oval-shaped micro-organism known as the *Bacillus Bovi Septicus*.

The disease was first pronounced in Germany in 1879, and is, therefore, comparatively speaking, quite new. It was first seen in America in the year 1898, when it made its appearance in Tennessee.

The first outbreak discovered in Canada was in 1902 at a place called Bury, near Sherbrooke, in the province of Quebec. In September, 1902, this Department requested me to investigate a disease in cattle at Bury that was thought to be anthrax. After a careful investigation I was satisfied that the disease was not anthrax. Instead, I found symptoms and post mortem lesions similar to those described in the text books as hemorrhagic septicemia. As the disease was then unknown in this country, I did not wish to pronounce positively without further investigation.

One year later, in September, 1903, I again visited the Sherbrooke district, and, in company with Dr. A. W. Tracy, the local veterinarian, visited an infected farm where we found some very typical cases and positive post mortem lesions. I then had no hesitation in pronouncing the disease hemorrhagic septicemia. From year to year since, this disease has been frequently seen in different

parts of Quebec. Some years later it appeared in the north-eastern counties of Ontario, then in other provinces, until at the present time hemorrhagic septicemia has been reported in nearly all the provinces of the Dominion. I am convinced that the disease existed in the Eastern Townships of Quebec prior to 1902, and was then confused with anthrax and black quarter.

There have never been any very serious outbreaks in this country; usually from one to three or four cattle have died on the same farm. Occasionally a more severe form is seen, when eight or ten cattle die on the same premises. Fortunately the disease usually disappears in a short time, and the same farmer may never have any more losses. It is very possible that the cattle which are exposed acquire a natural immunity, which is Nature's way of vaccination, and may protect the animal for the rest of its life. The mortality in cattle which suffer from the disease is very high, ranging from eighty to ninety per cent or more.

There are certain localities where the disease is most prevalent. These localities, low-lying, swampy lands, are favourable to the existence and perpetuation of the virus.

Infection is introduced into the body principally by the digestive tract, sometimes, however, through a wound on the surface of the skin, or on the membranes (mucous) lining the organs inside the body.

RESEMBLANCE TO OTHER DISEASES

The symptoms of hemorrhagic septicemia vary in accordance with the organs which are principally involved.

The disease somewhat resembles, and may be confused with (1) anthrax, (2) blackquarter, (3) cerebro spinal meningitis, and (4) milk fever.

The sudden death of the animal with passage of blood from the natural openings leads one to suspect anthrax.

The swellings sometimes found on the neck, throat, legs and sides in young animals somewhat resemble blackquarter.

The nervous symptoms, as delirium twitching of the muscles, and loss of control of the body, are often mistaken for cerebro spinal meningitis.

Other cases present symptoms almost identical with milk fever.

In some forms of the disease, therefore, it is difficult for even an experienced veterinarian to arrive at a correct diagnosis during the life of the animal. Post mortem lesions, however, are very characteristic in hemorrhagic septicemia, and can be easily distinguished from the above diseases.

SYMPTOMS

First, the animal is rather dull, standing with arched back; the temperature is extremely high, from 104° F. to 108° F., and may suddenly drop to normal. In other cases I have seen a very high temperature just before death, the temperature prior to this being quite normal. Breathing is laboured, pulse quick and very weak, and becomes almost imperceptible as the disease progresses.

The manure is very black (tarry) and semi-liquid, and is accompanied by large quantities of clotted blood, and the animal may practically bleed to death by the intestines. This symptom is almost always present, but much more marked in some cases than others.

The animal will sometimes become delirious, push its head into the manger, stagger around or turn round in circles, finally going down, and will lie in a stupefied condition with the head around towards the flanks as in milk fever; death follows this stage in a few hours.

In other cases there are swellings on different parts of the body, especially in the neck region and the sides. These swellings are flabby and not sensitive. Blood may ooze from the nose and through the skin.

There is very rapid emaciation. A fat animal will become a mere shadow in only a short time. Death usually takes place in from two to ten days; recovery very seldom.

POST MORTEM APPEARANCE

Often-times the first thing noticed on opening an animal is the pale, bloodless appearance of the muscles.

The portions usually affected in hemorrhagic septicemia are the outer (serous) coats of all the internal organs, especially the heart, lungs, stomach, intestines, brain and spinal cord; also the inner or mucous coats of the stomach and intestines. The lesions found resemble blood splashes varying in size from a pin prick to large areas, often giving the organ a black, bruised appearance. These areas (hemorrhagic areas) are usually surrounded by a straw-coloured, jelly-like substance (lymph). On skinning the animal these areas are often found immediately under the skin, and resemble bruises.

TREATMENT

At the present time there is no known cure for hemorrhagic septicemia. A great many drugs have been tried, but nothing has proved satisfactory. Vaccination and serum treatment have proved successful in some cases, but are yet only in the experimental stage.

PREVENTION

A change of pasture; strictly isolate the sick animals and remove them to a place where they can be burned when death takes place. All carcasses should be burned if possible where the animals die, and the stables or other places occupied by sick cattle should be thoroughly cleansed and disinfected.

Hemorrhagic septicemia does not come under the operation of the Animals Contagious Diseases Act, but an inspector is always sent to investigate and offer all the advice and assistance possible.

I am pleased to say that during the last four or five years the disease has greatly decreased in this country.

THE LIVE STOCK BRANCH

THE CANADIAN BANKERS' COMPETITION

ACTING in co-operation with the Dominion Department of Agriculture, Live Stock Branch, the Canadian Bankers' Association is offering cash prizes to boys and girls who exhibit calves or pigs at their local fair and who comply with the following rules governing the competition:

RULES

1. Only boys and girls who have not attained their 17th birthday before the opening day of the show are eligible to compete in the Canadian Bankers' Competition.
2. No entry fee will be charged.
3. No exhibitor shall be allowed to make more than one entry in a class.
4. Not more than one member of a family shall be allowed to compete in a class.
5. An exhibitor who wins a cash prize at one fair shall not be allowed to compete in the same class at another fair.
6. Calves and pigs entered for competition must have been born on or after March 15th, 1917, and must be the property of the exhibitor or the exhibitor's parent or guardian.
7. Grade bull calves, and grade boars, are not eligible to compete, and entries for same must not be accepted.
8. Exhibitors must feed and care for the animals they exhibit for at least six weeks.
9. An application form and a certificate form are attached hereto.

(a) The application form must be properly filled out and filed with the manager of a local branch bank at least three weeks before the date of the fair.

(b) The certificate must be filled out and signed by the parent or guardian of the exhibitor, and filed with the Secretary of the Fair not later than the day of the competition. If, however, an exhibitor fails to present his certificate

on the day of the competition, he shall be allowed to compete, but any prize he may win shall be withheld until a properly filled and signed certificate is produced, and said certificate must be forthcoming within forty-eight hours after the holding of the competition, otherwise his prize money shall be forfeited.

10. A statement, in writing, signed by the Secretary of the Fair, certifying the names of successful competitors and the prize money won by each, must be procured by the local branch manager at whose branch the general prize money of the fair is paid to competitors, or whose branch, in case the prize money is disbursed in cash by an official of the Fair, is the banker for the official funds of the Fair. The branch manager will, upon receipt of the certified statement, pay the prize money directly to the successful competitors or to the Secretary of the Fair for disbursement by him, according as the general prize money is paid to competitors directly by the bank or to the Secretary or other official of the Fair, taking in either case a receipt on the certified statement.

The receipted statement must be forwarded forthwith, under registered cover, to the Secretary of the Canadian Bankers' Association, National Trust Building, Montreal.

11. In case the winner of a prize is subsequently disqualified, each exhibitor below him shall be moved up one place.

CLASS I.

(Grade bull calves must not be shown).

Calf, Pure Bred or Grade.—Prizes:—1st, \$5.00; 2nd, \$4.00; 3rd, \$3.00; 4th, \$2.00; 5th, \$1.00; 6th, Ribbon.

CLASS II.

(Grade boar pigs must not be shown)

Two Pigs, Bacon Type, Pure Bred or Grade.—Prizes: 1st, \$5.00; 2nd, \$4.00; 3rd, \$3.00; 4th, \$2.00; 5th, \$1.00; 6th, Ribbon.

It is expected that these competitions will afford especial opportunities for interesting boys and girls and their parents in the bank as an institution as well as bringing forcibly before their minds some idea of the importance of live stock.

In districts where beef cattle predominate it is expected that the prizes will be offered for calves of beef type and in dairy sections for calves of dairy type. In all cases the prizes for pigs will be offered for pigs of bacon type only.

In connection with this competition placards, as shown herewith, together with folders outlining the rules and regulations of the competition have been generally distributed. Already in both Eastern and Western Canada a great deal of interest is being shown by the bankers in making this competition a success and it is felt that the work of the bank managers will mean a great deal in promoting the conservation and improvement of young stock. Six hundred fairs are expected to participate in the competition this year.

DOMINION DEPARTMENT OF AGRICULTURE HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE
WHO HAVE ENLISTED FOR OVERSEAS SERVICE

G. W. McCutcheon, Winnipeg.

CASUALTIES

Pte. F. A. Weldon (killed in action).
Pte. J. S. McLeod (killed in action).

PART II

Provincial Departments of Agriculture

HOME CANNING FRUITS AND VEGETABLES

PRINCE EDWARD ISLAND

BY MISS HAZEL L. STERNS, SUPERVISOR, WOMEN'S INSTITUTES

THE Women's Institute Branch of the Department of Agriculture has encouraged to a great extent the home canning of fruits and vegetables.

Practical demonstrations on the subject have been given by the supervisor to the majority of the women's institutes in the province, and where it was not possible to give a demonstration, lectures were held,

and the different processes in canning explained.

Bulletin No. 1, of the Women's Institute Branch, entitled "The Home Canning of Fruits and Vegetables", was distributed to the members of the institutes as well as to all who requested a copy. The bulletin gives clear directions for the canning and preservation of the various vegetables and fruits.

NOVA SCOTIA

BY MISS JENNIE A. FRASER, SUPERINTENDENT, WOMEN'S INSTITUTES

BELIEVING that the time to urge the greater production of food and the correct preservation of the same for one year is to start the year before, we did quite a bit of preparatory work in 1916. At the provincial exhibition held annually at Halifax, the last one being in September, 1916, we arranged a splendid exhibit of vegetables of the many different varieties easily grown in Nova Scotia together with another exhibit equally as good of canned vegetables. These exhibits, shown at the instigation of the women's institute branch, were prepared with great thoroughness by the horticultural department of the College, which department has gone very extensively into the canning of

vegetables. The displays proved to be among the most interesting points of the fair and numbers of people, daily, evinced great interest in them. Placards were tacked up all over the grounds, calling attention by striking phrases to the exhibit and to the necessity of growing more vegetables and to the canning of the surplus. Information about the planting and cultivation of the different varieties of vegetables was distributed in the form of leaflets. A comprehensive bulletin entitled "The Cooking and Canning of Vegetables", had been prepared by the writer and Prof. Shaw, Provincial Horticulturist, which also contained a short article on the value of "Vegetables in the Diet". No one was allowed to leave

this section of the grounds without the leaflets and a copy of the bulletin. The bulletin has been in such demand that the first edition has been exhausted and a new one is in preparation. In the one now under way the article on "Canning Vegetables" will be enlarged and new articles on

of economy and thrift along all lines. At short courses, women's institute meetings and on every available occasion demonstrations in canning, the preservation of food generally and talks on thrift have been given.

At the coming provincial exhibi-

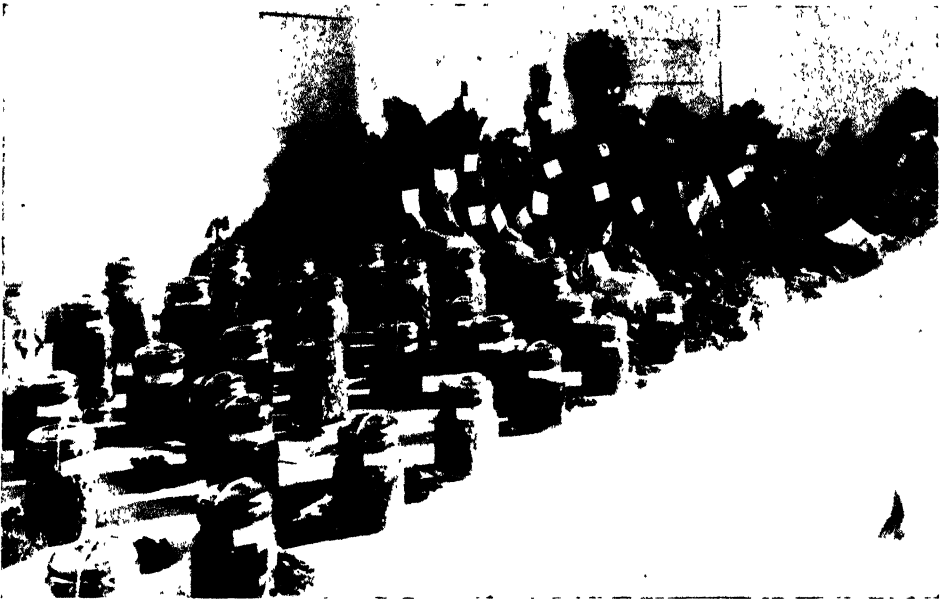


EXHIBIT OF VEGETABLES, CANNED PRODUCTS, ETC., OF THE NOVA SCOTIA AGRICULTURAL COLLEGE

"Canning Fruit and Preparing Jellies" will be added.

Since the exhibition last autumn we have not let the subject drop but have taken every opportunity to urge the greater production and the conservation of food, and to encourage more thorough practise

tion to be held early in September we intend giving practical demonstrations in canning fruit and vegetables and preparing jellies, which demonstrations will be given on as large a scale and made as practical as possible.

BY L. A. DEWOLFE, DIRECTOR, RURAL SCIENCE SCHOOLS

AMONG our school children, canning has received less attention than it deserves. Fortunately, however, we are improving.

At our rural science summer school, canning is an important feature of our horticultural class. Last year

and this year, many students took advantage of the practical work in this subject. Students are allowed to keep their canned vegetables, taking these to their homes and to their schools does much to increase the interest in such work among the people in general.

At the various school exhibitions last fall canned vegetables were not uncommon. Older people asked questions about the methods used, and expressed great pleasure at seeing the schools do such practical work.

Besides the rural science summer

school, the domestic science department of the Normal College gives a course in canning. Each year, therefore, about 400 teachers learn something of the work. Possibly one-fourth of this number carry it to their schools.

NEW BRUNSWICK

BY MISS HAZEL E. WINTERS, SUPERVISOR, WOMEN'S INSTITUTES

LAST March a circular letter was sent to all the women's institutes in our province asking them to let us know if they would care for a demonstration on the canning of fruits, meats and vegetables. In response to this letter fifty institutes asked for the demonstration and we have in the field now, two household science teachers giv-

ing these demonstrations. We are also endeavouring to supply other societies with demonstrations relating to canning, such as the Housewives' League, various chapters of the I.O.D.E., and Women's Canadian Clubs. As requests keep coming to hand, no doubt at least seventy-five demonstrations will be given before the canning season is over.



NEW BRUNSWICK DOMESTIC SCIENCE TEACHERS IN CONFERENCE AT SACKVILLE, N.B.

These teachers are giving their summer, free of charge, to teaching short course classes in food preservation and conservation

A bulletin, "Modern Methods of Canning", recently prepared by Miss Ada B. Saunders, Assistant Supervisor, is being sent to all members, and to members of other societies upon request.

The women and girls are most enthusiastic over canning this year and I think the results of these demonstrations and distribution of literature will be most gratifying. We have not done such a great deal in our own department, simply because the Department of Education is taking an active part in this work, such as providing demonstrators and forming girls' efficiency clubs, and the women's institutes are promising support to the girls' clubs in making them productive of much good.

In connection with the annual women's institute convention to be held at Moncton, N.B., October 2nd, 3rd and 4th, 1917, we are conducting a canning competition, the rules governing which herewith follow:

1. That only members having paid fees for the current year contribute jars to the Institute exhibit.

2. That no more or no less than twelve jars be included in the exhibit, and no two jars must be alike.

3. That at least five of the fruits, five of the vegetables, and two of the meats be selected from the following:

<i>Fruits:</i>	<i>Vegetables:</i>	<i>Meats:</i>
Strawberries,	Beans,	Salmon,
Raspberries,	Peas,	Poultry,
Pears,	Corn,	Beef,
Plums,	Tomatoes,	Pork,
Peaches,	Spinach,	Game.
Cherries,	Mushrooms,	
Blueberries,	Beet tops,	
Currants,	Beets,	
Rhubarb,	Dandelion greens,	
Quinces,	Carrots,	
Grapes,	Fiddleheads,	
Apples,	Asparagus,	
Crabapples,	Swiss Chard,	
Blackberries,	Pumpkin,	
	Parsnips.	

4. That only pint jars with glass tops and wire clamps be used.

5. That each jar be labelled with a gummed label provided by the Department free, with the name of contents, name of Institute and date of canning neatly printed thereon, this label to be placed on the face of the jar at the bottom.

6. That the Institute pay express charges to Moncton and if the Department cannot arrange with the railway to give free return transportation, the Institute will pay for same.

7. That each exhibit be carefully packed and the list of contents with name and address of shipper (Institute secretary, etc.), enclosed with exhibit.

8. That if the jars are to be sold and the money forwarded to the Institute, the memo of contents enclosed in exhibit will say so, or if jars are to be returned, this memo will indicate such.

9. That each Institute notify the Supervisor as to entering the competition not later than August 31st, after which date each branch will be informed as to the number competing.

10. That all exhibits be sent by *Express* (when possible), to the Supervisor, Moncton, N.B., not later than September 27th.

PRIZES WILL BE AWARDED ON THE FOLLOWING BASIS

IF FROM	1st Prize	2nd Prize	3rd Prize	4th Prize	5th Prize	6th Prize	7th Prize	8th Prize	9th Prize	10th Prize	11th Prize	12th Prize	13th Prize	14th Prize	15th Prize	16th Prize	17th Prize	18th Prize
85 to 90 Inst..	\$22	\$21	\$20	\$19	\$18	\$17	\$16	\$15	\$14	\$13	\$12	\$11	\$10	\$9	\$8	\$7	\$6	\$5
80 " 85 "	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	
75 " 80 "	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5		
70 " 75 "	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5			
65 " 70 "	18	17	16	15	14	13	12	11	10	9	8	7	6	5				
60 " 65 "	17	16	15	14	13	12	11	10	9	8	7	6	5					
55 " 60 "	16	15	14	13	12	11	10	9	8	7	6	5						
50 " 55 "	15	14	13	12	11	10	9	8	7	6	5							
45 " 50 "	14	13	12	11	10	9	8	7	6	5								
40 " 45 "	13	12	11	10	9	8	7	6	5									
35 " 40 "	12	11	10	9	8	7	6	5										
30 " 35 "	11	10	9	8	7	6	5											
25 " 30 "	10	9	8	7	6	5												

NOTE.—If less than TWENTY-FIVE Institutes compete no prizes will be awarded, but transportation charges will be paid both ways.

HOME EFFICIENCY CLUBS OF NEW BRUNSWICK

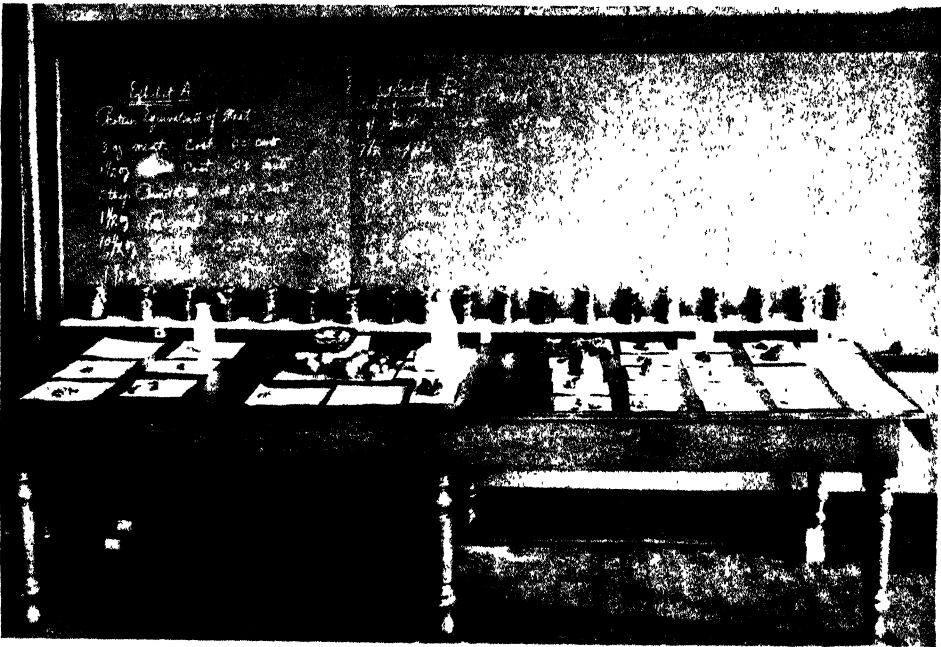
BY FLETCHER PLAROCK, DIRECTOR OF MANUAL TRAINING

AS a part of the campaign for greater food production in New Brunswick, the domestic science teachers of the province volunteered in May last to devote their vacation to carrying on short courses in canning and other means of preserving perishable foods, and to do this work without remuneration. In order to facilitate their efforts the Department of Education undertook to organize the girls and young

sewing, poultry raising, home economics, etc., and these activities will be developed here. Already nearly a hundred home efficiency clubs have been formed, and the organization work is progressing rapidly.

DEFINITE OBJECTS OF CLUBS

1. To lead the girls to co-operate in greater production and better preservation of foods.
2. To teach economy and thrift.
3. To teach definite methods of pre-



EXHIBITS USED IN THE HOME EFFICIENCY CLUBS OF NEW BRUNSWICK AS A MEANS OF EDUCATION IN FOOD VALUES

women of the province into home efficiency clubs. The immediate object of these is of course to take care of the present year's increased crop of berries, fruits, vegetables, etc. The organizations are upon a broad basis, however, and it is expected they will become a permanent educational factor in connection with the schools. Girls' clubs in other provinces and states are doing work in

serving foods, and the use of labour-saving devices.

4. To encourage the utilization of by-products, and the value of home-grown fruits-and-vegetables, and in the proper rationing of the family.

- 5 To help the girls to more practical and efficient citizenship.

SUGGESTED REQUIREMENTS

1. Centres or districts maintaining a single department school may form a girls'

club, with only 10 members,—others should have at least 15.

2. Club members should be at least 14 years of age or in Grade VIII, and must agree to follow directions carefully and conscientiously. Each one should grow all the materials possible for canning or otherwise preserving.

3. Each girl must supply her own materials, containers and utensils for the practical work that will be taken up.

4. Each club will have its own president and other officers, who will keep careful records of the work done by the members and report to the Education Department. Forms will be provided.

5. Club meetings should be held monthly, at least. Programmes will be suggested in the literature to be distributed.

6. Each member should keep careful accounts of the cost of materials, containers, time, etc., on forms provided.

7. Each club member should agree to take care of at least 25 quarts of food materials in 1917.

During the second week in July the thirty domestic science teachers volunteers met in convention at Sackville to plan their short courses for the clubs. In this they received very great help from Miss Netta Nixon of the Ontario Agricultural College, whom Hon. Mr. Hanna, Food Controller, provided. Miss White, Miss Peacock and Miss Borden, who have studied and worked with clubs in the States, were also leaders of the conferences. These volunteers are now working through the province, spending four or five days with each club. The demonstration plan is not used. Instead the club members bring their fruits and vegetables to a room provided and inexpensively equipped by the local school board, and this room for the time becomes a canning factory. Vegetables and native fruits are principally used. After four or five days' experience the club members can carry on the

work in their own homes for the rest of the season.

In addition to the actual canning, the teacher gives talks on other means of preserving foods, such as drying, salting, etc. She also stresses the necessity for economy, intelligent substitution, elimination of waste, etc., in the use of food. An exhibit showing comparative food values is set up in each community. Each club member must agree to can or otherwise preserve at least twenty-five quarts in 1917. Many have even now doubled this minimum. They all report to the education office, and reports received indicate that the movement is already a great success. At first the club members were encouraged to provide all the canned goods that would be needed in their homes, but many are taking up the work on a commercial basis. Only the most common and inexpensive equipment is used. The wash boiler fitted with a false bottom is the most popular sterilizer, while the lightning top jar is the favourite container.

SHORT COURSE AT THE NORMAL SCHOOL

Falling in line with some American institutions, the New Brunswick Normal School gave up the last week of the spring term to an emergency course in canning and food preservation generally. So that the 500 students in attendance, most of whom will have charge of schools in the province this fall, have had this item of the nation's need brought practically to their attention, and have been trained in the most effective ways and means of assisting to solve the problem of food preservation and economy. They are everywhere acting as missionaries and helpers, and will very greatly help in the success of the Club movement.

MACDONALD COLLEGE

BY MISS KATHERINE A. FISHER, HEAD OF THE SCHOOL OF HOUSEHOLD SCIENCE

THE School of Household Science is co-operating very closely with the demonstrators for rural school work, in the encouragement of greater production and preservation of farm crops, especially among the boys and girls. In connection with this work our demonstrators to homemakers' clubs go out to the schools and give demonstrations to the children in breadmaking and in canning fruits and vegetables. We also send, to each child competing, a copy of our bulletin on canning of fruits and vegetables and one giving directions in breadmaking. We have distributed and are still sending out thousands of these this year, so that each child exhibiting may have definite instructions to follow. Our demonstrators also give, in the schools, demonstrations to mothers and to school children on the question of food for growing children and the noon lunch at school. In doing this we feel that most valuable work in the conservation of the children themselves is being accomplished. In the autumn the school also provides judges for these school fair exhibits.

In addition to this work in the

rural schools, we are also working through our homemakers' clubs in reaching the women in the home. Our demonstrators this year are putting forth special efforts in regard to increased production and preservation through demonstrations and lectures in canning and drying of fruits and vegetables and in encouraging the clubs to devote a number of their meetings to a study of food production, better methods in gardening, dairying, and poultry keeping as well as to a consideration of a wider use in the diet of meat substitutes, garden produce and our various Canadian cereals that might partly substitute wheat.

This summer we have had several requests from housewives' leagues and Daughters of the Empire in different parts of the province for demonstrations and lectures in food economy and canning. To these we are responding and it is encouraging to find a rapidly growing interest on the part of the women of the province in the problem of food conservation. Everywhere they are most anxious to receive definite instructions in regard to this problem.

ONTARIO

BY GEO. A. PUTNAM, B.S.A., SUPERINTENDENT, INSTITUTES BRANCH

IN the province of Ontario an active campaign to increase and make available for most profitable use what may be termed garden crops, has been undertaken. This work has been accomplished through horticultural societies, municipal councils, boards of trade, women's institutes, etc. In the early spring a Home Garden competition was organized in connection with the women's institutes. This was described in the April number of THE

AGRICULTURAL GAZETTE, page 271. In connection with this each of 64 women's institutes received ten packages of seeds for distribution to their members. Each member was also given a practical bulletin on the raising of the ordinary garden crops. In addition, a large number of speakers were sent out by the Institutes Branch of the Department of Agriculture to address meetings called by institutes, churches, municipalities, and other organizations. A large

supply of perishable garden crops being thus assured, the next step was to encourage its conservation. An exhaustive bulletin entitled "The Preservation of Food-Home Canning" has been prepared and sufficient copies printed to supply not only every one of the over 30,000 members of the women's institutes, but others in the province who are likely to apply for it.

While this bulletin is complete and clear in its treatment of the subject which covers fruits, vegetables, eggs and meats, the Department is prepared to supply demonstrators to such organizations as may ask for them.

While the canning of fruit is an art well known to the average house-keeper, there seems to be an urgent demand for more information regarding the canning of vegetables, and meats, and the demonstrators will be prepared to give instruction on these features. Some of the organizations are having two demonstrations during the season, one in late July or early August when the canning of the

early fruits and summer vegetables,—beans, peas, spinach, young beets, carrots, etc.—will be taken up, and a late meeting in the latter part of August or in September, for the demonstration of the canning of corn, tomatoes, peaches, etc. In some centres the demonstrations are held for from two to four days, to give every woman and girl in the community a chance to attend. In Brampton, for example, the demonstration was held from Wednesday to Saturday. In one half of the towns the women attend on Wednesday afternoon, the other half on Thursday, the girls of the High School Girl's Club and Girl Guides on Friday afternoon; the factory and business girls on Friday evening, and the women from the district around the town on Saturday. The meetings were advertised in the local press and in many places the clergy, feeling that this step in the way of the conservation of food is a matter of great national importance, announced them from the pulpit.

MANITOBA

BY S. T. NEWTON, B.S.A., SUPERINTENDENT, EXTENSION SERVICE

THIS campaign was really started last year when Miss R. M. Atkinson, one of the extension service demonstration lecturers, took a special course in the canning of vegetables, meats and fruits at Columbia University, New York. Following this, a gardening and canning contest was organized as a part of the boys' and girls' club work, and seeds, the products of which could be readily canned, were supplied to nearly 10,000 club members. Besides this, a large number planted their own seeds.

Naturally, instructions in both gardening and canning were in demand and bulletins were prepared, and an edition of 10,000 canning bulletins was exhausted in less than

60 days, almost 3,000 going outside of the province in response to requests received. A second edition of 10,000 copies is being printed.

In addition, 7,000 canning posters were prepared and exhausted in 10 days.

During the whole year lectures and demonstrations on canning were given by Miss Atkinson, and during July and August it was necessary to employ two additional demonstrators to meet the demand for instruction on this subject.

Each demonstrator takes with her all the necessary equipment with the exception of a coal oil stove, and this article can usually be obtained at each point.

The general equipment includes



PREPARE
THE
PRODUCT

PREVENT
WASTE

PACK
AND
COOK

BY
CANNING YOUR SURPLUS PRODUCTS
 A FEW FACTS



WASH CLEAN



SNIP ENDS AND STEMS



BLANCH IN HOT WATER



PLUNGE IN COLD WATER

The world's surplus food is almost exhausted.

The 1916 supply of factory canned food has already gone to the battle front. The 1917 supply is already contracted for. If you want canned foods, you must do the canning yourself.

Millions of dollars' worth of fruits and vegetables are wasted on this continent every year because people do not know how easily any food material may be preserved by the process of canning.

Health and necessity require that vegetables be found more frequently on our tables, in order to free a larger volume of less perishable foods for the use of our Allies.

18,000 Boys and Girls in Manitoba have planted ten tons of vegetable seeds, and are carefully looking after their gardens. They are depending on you to show them how to save the results of their efforts.

You have done well in getting the great crop started; it is equally necessary that it be successfully preserved.

Vegetables and fruits can be successfully preserved by canning. Every family should provide a can of fruit, a can of vegetables and a can of meat for every day in the year.

CANNING THE PRODUCTS

The Cold or Raw Pack Method of Canning is so simple that anyone with an ordinary kitchen equipment may can anything if the directions given below are followed

- 1 Choose freshly gathered vegetables or fruits
- 2 Wash them
- 3 Place in a wire basket or cheese-cloth bag
- 4 Dip in boiling water, as follows: Fruit, 1 to 2 minutes; vegetables, 2 to 5 minutes; meat, 8 to 10 minutes.
- 5 Plunge quickly into cold water for half a minute.
- 6 Pack into jars or cans. For vegetables, fill with water; fruits, fill with a 3 to 2 syrup (3 quarts sugar to 2 quarts water), and for meats fill with pot liquid. Add one-half teaspoonful of salt for one pint of vegetables or meat.
- 7 Put tops of jars in place and make almost tight.
- 8 Place on a wooden rack in the wash boiler, and fill with water until it stands one inch above the tops.
- 9 Boil as follows: counting from the time the water boils or jumps up and down: Fruit, 12 minutes; tomatoes, 20 minutes; vegetables, 2 1/2 hours; peas and corn, 3 hours; meat, 3 hours.
- 10 Tighten tops as soon as the jars are taken out of the boiler.

Label, wrap and store in a cool dark part of the cellar.

It is almost impossible to buy cans, and jars have increased in price from 25 to 50 per cent; hence all patriotic citizens should see to it that every empty jar is filled either by themselves or loaned to their neighbours.

Write to the Extension Department at the Manitoba Agricultural College, or to the Publications Branch, Manitoba Department of Agriculture, Winnipeg, for the New Canning Bulletin.



PACK CLOSELY



DO NOT SEAL TIGHT



COOK 2 HOURS



SEAL TIGHT AT ONCE

several aluminum dishes and a pail sufficiently deep that when a pint jar is placed in it on a rack the water will come one inch above the jars without overflowing when the water boils. Samples of the various kinds of jars are also taken along. The following is the complete equipment:—1 canning chart; 1 steam cooker; 1 pail; 1 hot pan lifter; 1 pudding

pan; 2 plates; 2 funnels; 1 frying pan; 2 knives; 1 brush; 2 spoons; 6 dish towels; 2 pint sealers; rings, cheese cloth, oil cloth.

The total attendance at the various demonstrations will be close on 7,000 by the end of August, while on an average fifteen letters a day are received regarding equipment and methods.

SASKATCHEWAN

BY MISS ABBIE DELURY, DIRECTOR, HOMEMAKERS' CLUBS

WE have not gone about the matter of food conservation in any elaborate way. Perhaps the most effective thing we have been able to do has been the issuing of bulletins bearing on the subject. I say most effective because the propaganda can be made more general through them. These are sent to all our clubs and to other women's organizations and to individuals who make known their needs to us. Also we have been making use of the press to spread knowledge

of food economy and production.

At our June convention, where we had 400 delegates representing about 5,000 women, we had valuable talks on the subject and very valuable discussions. Demonstrators are sent out just as they are requested and the demand for canning demonstrations is increasing.

The two bulletins referred to are: "The Value of the Kitchen Garden", and "Preservation of Food". Each of these has been circulated widely.

BRITISH COLUMBIA

BY WM. E. SCOTT, DEPUTY MINISTER, DEPARTMENT OF AGRICULTURE

THE women's institutes throughout this province, since the commencement of the war, have been very active, not only in the way of working to good effect for different patriotic purposes, but also to encourage production and eliminate waste. With this end in view, the Department secured the services of Mrs. Chalmers of Thrums near Nelson; a lady who is carrying out most excellent and successful work along intensive lines of farming and who is also an expert in the putting up and preserving of bottled fruits and canned goods.

We arranged an itinerary for all of the women's institutes, numbering

fifty-nine; these meetings were very popular and numerously attended by members. Mrs. Chalmers dealt with live-stock on the farm, soils and crops, dairying, poultry-raising, vegetable gardens, preserving and canning of fruits and vegetables. This itinerary appears to be the most successful one ever yet carried out by the Department in connection with our women's institutes work, and I am satisfied that many good results have been accomplished by them.

By means of the excellent talks given by Mrs. Chalmers, our farm women have received very valuable pointers, which will aid them to in-

crease the production of their farms by the adoption of intensive methods of farming. The necessity of thrift and economy was also taken up by Mrs. Chalmers at the lectures, and members were instructed as to how they could best conserve food supplies and make them go as far as possible.

With regard to the supplying of vegetables seeds to our women's institutes, the Department has taken no steps in this connection except by way of encouraging co-operative buying of such seeds, by the institutes themselves, and many of the institutes have done very useful work along these lines.

We have not issued any posters or advertisements direct to our

women's institutes, except through the medium of our *Women's Institute Quarterly*, where patriotism, production and thrift have been urged.

With regard to the supplying of demonstrators in canning and the preserving of foods in other ways, in addition to the work outlined by the Department through Mrs. Chalmers, our institutes themselves have been giving demonstrations in the canning and preserving of fruits, vegetables and meats.

The women's institute movement is becoming a very strong organization and there is no doubt but that very valuable work has been done along these lines by them since the commencement of the war.

EFFORTS TO POPULARIZE HOME CANNING

BY JOHN KYLE, ORGANIZER OF TECHNICAL EDUCATION FOR BRITISH COLUMBIA

IN British Columbia a regular war propaganda has been conducted for economy and production, the domestic-science instructors of the various districts, almost without exception, taking a prominent part in the movement. In the cities of Victoria, Vancouver, New Westminster, Nanaimo, Nelson, Vernon, Armstrong and Kelowna, frequent public meetings have been held, and demonstrations freely given showing the public various methods of canning and preserving fruit, vegetables, eggs and fish.

The largest fall fair in the province is held in Vancouver; and there, for the last three years, the domestic-science instructors of South Vancouver and Burnaby municipality have given their services willingly to the public in order to demonstrate methods of preserving fruit and cooking economical dishes. The fruit was supplied by the B.C. Fruit Growers' Association, and systems of preserving, with or without sugar,

and with cold water, have been carried out for public inspection.

Needless to say, the work of canning and preserving fruit is carried on extensively in the fruit-growing districts of the province, and much research work is being conducted by the school instructors of domestic science, encouraged and assisted by the members of the women's institutes.

Co-operative canning societies are being formed in various districts, and thus individuals may have the use of a canning equipment having commercial capacity. As a rule cans are manufactured locally, and a clever home-canning equipment for sealing is made by a firm in Vancouver, so that the local product may be put on the market having a thorough professional appearance. At the coast a specialty is made of preserving fish, and great success has attended efforts in this direction. The Victoria Whaling Company entrusted one of the domestic-science

instructors with the work of experimenting on the cooking of whale meat, and the results have been eminently satisfactory. Preparation and methods of cooking have reduced the objectionable features to the minimum, and much good will undoubtedly result from the work accomplished. Just as the prejudices of the public had to be overcome before the dog-salmon and hump-backed salmon became common articles of diet, so it is believed that whale meat will gradually take

its place on the table when the public becomes assured of its wholesomeness. The meat is equal in dietary quality to the best beef, and can be purchased at one-third the retail price. These two facts warrant serious effort being made to popularize it.

During the coming season, increasing attention will be devoted to everything pertaining to the great essentials which will result in economy and production.

GARDENING AND CANNING COMPETITION FOR GIRLS

BY L. H. NEWMAN, B.S.A., SECRETARY, CANADIAN SEED GROWERS' ASSOCIATION

IN the spring of 1915 a Gardening and Canning Competition, open to girls between the ages of ten and eighteen years of age, living on farms in the county of Carleton, Ont., was inaugurated. This competition was continued in 1916 and again in 1917. The objects of this contest are as follows:—

1. To aid in the general movement for the re-construction of education for rural districts by providing a practical medium of instruction in elementary horticulture and agriculture in rural schools.
2. To create a new interest in Mother Earth and show what she is capable of doing if properly handled.
3. To provide instruction in the growing and canning at home of our leading vegetables and small fruits.
4. To arouse an increased interest in the preparation of better food, especially for winter months, all of which makes for better living and better health.

RULES OF CONTEST

Each competitor was required to operate a garden of as nearly one-twentieth-acre in area as she might find convenient. After the ground was prepared for planting the competitor was required to do all the work

herself and to keep a record of work done. Certain plants, namely, raspberries, carrots, onions, beets, tomatoes, peas and beans were required to be grown, but others could also be included, if desired. The plot of each competitor was to be inspected and judged during the growing season and the score awarded taken into consideration in making the final awards. Each competitor was also required to send an exhibit entirely the product of her own garden to the county fair in September, when they would again be judged. A written report or essay was also required of each competitor and the marks allowed on this report together with those awarded at the county fair and on the condition of the garden determined the final award.

The sum of \$100 was offered by Mr. R. B. Whyte of Ottawa to be divided among all girls in the competition winning 200 points out of 300. Mr. Whyte also sent each competitor free of charge, forty raspberry plants.

The results obtained during the past two years of this competition have been most gratifying. In spite of the very unfavourable season of 1916 some of the girls had really excellent gardens, which went to prove that even the worst sort of weather conditions may be overcome to a great extent by thorough work and intelligent application.

PRINCE EDWARD ISLAND

O. P. V. ENSILAGE

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

THE growing of oats, peas and vetches as a combination crop for various purposes has been receiving the attention of stockmen in various parts of the Maritime Provinces for a past number of years.

As a hay crop the combination has met with favour throughout Prince Edward Island, and has given excellent returns in that capacity, but last season was the first trial of the crop for ensilage purposes. The hope is that it will prove to be a reliable substitute for corn which is the universal ensilage crop, but which is an uncertainty over the greater part of the three Eastern Provinces.

A field of approximately four acres belonging to the Rev. P. C. Gauthier of St. Louis was sown with a combination of $2\frac{1}{2}$ bushels oats, one-half bushel peas, and one-half bushel vetches per acre. The crop was of a luxurious growth, and was cut when the lower part of the plants began to change colour, or when the grain was in the dough stage. An estimate would place the yield at $10\frac{1}{2}$ to 12 tons per acre, green weight. It was then put through an ensilage cutter and packed firmly into a stone silo, which was erected just before cutting. On inspection at periods ranging from two to six months after cutting, the ensilage was keeping in prime order and proved to be exceedingly palatable for dairy cows. Owing to lack of facilities the ensilage was not tested for dry matter content, but from the results obtained at the

Agricultural College, Truro, Nova Scotia, the combination crop tested 8 per cent higher in dry matter than the corn crop of the same year.

That O.V.P. ensilage will receive greater attention from feeders of this province can be accepted as final. Although the investigational work of ensiling and feeding the crop has been of recent origin and confined to a few localities, the feeling that it can receive a widespread adoption is felt by the majority of the prominent feeders.

A debatable point with many feeders is the kind and cost in connection with the erection of a suitable silo. A cement, stone or brick silo is usually accepted as being the most reliable for all purposes where any of the three materials is easily available, but for ordinary purposes the stave silo gives commendable results. In the instance cited, a stave silo, 20 ft. high and 12 ft. in diameter, was erected. The material was 2" x 6" scantling, planed inside with the edges bevelled. A cement foundation and roof were included, and all at a total cost of approximately \$60. When it is known that a stave silo when properly erected can be used for thirty years, as is proven by authentic records, the original cost does not seem large. Then the quality of the feed that it has for use is such that a silo becomes an important addition to the farm equipment when once it is adopted.

NOVA SCOTIA

THREE VARIETIES OF APPLES ORIGINATED IN NOVA SCOTIA

BY P. J. SHAW, PROVINCIAL HORTICULTURIST

THREE varieties of apples worthy of mention have originated in Nova Scotia. The first is the Banks' Red Gravenstein, or Banks. This apple originated as a bud sport of the Gravenstein on the farm of the late E. C. Banks of Waterville, Kings Co., N.S. It was first noticed and propagated by Mr. Banks about 1880. It is much the same as the Gravenstein in season and flavour, but is less ribbed, more regular in shape, and far more highly coloured. On account of its brighter colour it sells better than the ordinary Gravenstein. It has been quite largely planted in Nova Scotia.

RED RIBSTON

The Red Ribston was also noticed as a bud sport of the Ribston on the farm of Mr. A. S. Banks about 10 years ago. When scions from this branch were grafted into other trees

they produced Ribston Pippin apples except that they were solid red in colour.

RED KING

The Red King was found on the farm of Mr. Enos Thorpe, Lakeville, Kings County, N.S., a few years ago. Its origin is unknown, but it is believed to be a bud sport of Tompkins' King. It is so highly coloured that persons well acquainted with the King have failed to recognize it by its appearance as King. It has all the qualities of King, except that it is much more highly coloured. This apple has been grafted, and the grafts reproduce the red colour of the parent.

Mr. A. S. Banks also reports a sport of the Banks which is much redder in colour than the Banks. This is being propagated, but is not bearing this season.

QUEBEC

AGRICULTURAL EQUIPMENT FOR SCHOOLS

BY JEAN-CHARLES MAGNAN, SUPERINTENDENT OF SCHOOL GARDENS

FORMERLY, agriculture was taught in the schools only by means of agricultural text books, save for a small number of teachers who took the trouble to prepare object lessons with a very rudimentary equipment. It is gratifying to note to-day that considerable progress has been made in this direction.

When inspecting school gardens, we note that the teachers, acting upon the recommendation of the

provincial Department of Education and the Department of Agriculture, are beginning to form agricultural school museums, including material and objects necessary for a good elementary teaching of agriculture. For instance the forty-seven domestic science schools of the province have already done excellent work in this direction. Most of these schools have a suitable equipment for teaching practical lessons on dairying, poultry keeping, horticulture, ar-

boriculture, etc. This equipment, which includes several instruments, is the property of the school and is used only for practical demonstrations or object lessons.

Among primary schools quite a large number of academies, rural schools and colleges are well equipped to give proper teaching in agriculture. For instance, I observed during my visits that several schools have the following equipment: a hand sower with accessories, a few spades, rakes, hand hoes, weeding, cultivating and watering tools for the garden, a wheel-barrow, a spray pump for fruit trees, a pruning knife, a pruning saw, grafting knives, etc.

It is gratifying to note also that agricultural school museums have been formed in increasing numbers in

our schools for the last two years.

Such museums are composed of the following: collections of grains and grasses, etc., collections of useful plants, of weeds, of different soils, explanatory tables of varieties of vegetables, fruit trees, domestic animals, etc.; we also find some catalogues and magazines representing the principal farm implements, rural construction, etc.

All this cheap material is installed in a wooden cupboard with shelves, placed in one of the school rooms.

These museums have been organized by school boards, by the staff of the schools, or by the District Representatives of the Department of Agriculture. In each case private initiative has done its share.

NOTES

AGRICULTURAL EMPLOYMENT BUREAU

A bureau has been established by the Honourable J. Ed. Caron, Minister of Agriculture, to supply farm workers and encourage the "back-to-the-land" movement. From the beginning of April to the middle of May, 200 farmers have been put in touch with more than 300 workers, who seemed to have the necessary qualifications. Over 200 farms are

offered for sale or for exchange, at very fair terms. This new organization of the Department of Agriculture enables the farmers to secure the workers that are still available in some cities.

There are three branch offices in the following cities: Quebec, Montreal, Sherbrooke.

DEMONSTRATION FIELDS

Fifty-eight demonstration plots were established this spring in the various districts of the province. They include the following crops:

corn for ensilage, beets, swede turnips, clover grown for seed, beans, wheat, barley, potatoes, alfalfa and carrots.

FRUIT TREES

Some 40,000 fruit trees, including 36,000 apple trees, were distributed last spring through the horticultural societies. If this movement con-

tinues, the province of Quebec will soon occupy a very important place in horticulture.

FRUIT CROPS

According to information received up to the present, the next crop of apples will show a decrease of 35 per cent as compared with last year.

A full crop is expected, however, in the county of Two-Mountains. Plums and cherries are very plentiful in the district of Quebec.

YOUNG WOMEN'S CLUBS (CERCLES DE JEUNES FERMIERES)

Courses in domestic science will be given this year under the auspices of women's clubs by the teachers of the Department of Agriculture. These courses last four days, with two sessions per day. They include the following subjects: sewing, mending, food, lodging, house planning, sanitation, canned foods, agriculture

for women, etc. There is an attendance of 300 to 500 women and girls in each place.

Three new women's clubs have put themselves under the control of the Department of Agriculture: the clubs of Maria, Bonaventure county, Three Rivers and LaPrairie.

THE QUEBEC HOUSE KEEPERS' LEAGUE

This league, which has been organized recently, is making rapid progress, and its work is being encouraged by all classes of society. It will not only look after the material welfare of the members, but it will also develop their intellectual qualities for the good of the family and of the home.

One of the objects of this league will be to encourage the families to make a thorough and rational study of their budget, to purchase in co-operation the necessities of life and to make a study of foods, so as to be able to replace those that have become too expensive by other and cheaper ones.

ONTARIO**PRINCIPAL APPOINTED FOR KEMPTVILLE AGRICULTURAL SCHOOL**

W J. BELL, B.S.A., has been appointed Principal of the Kemptville Agricultural School, which appointment took effect Sept. 1st. Although the main building operations are not being proceeded with this year, there is a great deal of preliminary work which will require the attention of the Principal in the meantime. Contracts have been let for a live stock judging pavilion, which will be available for short courses during the coming winter. Farm buildings are also being erected and those already on the premises improved, and a splendid herd of dairy cattle is being assembled. The Principal will therefore have an opportunity of guiding these operations and laying the foundation for a successful opening of the school at the conclusion of the war.

Mr. Bell has had training which qualifies him admirably for the posi-



W. J. BELL, B.S.A.
Principal, Agricultural School, Kemptville, Ontario

tion which he is assuming. He was born in Wellington County, and spent his boyhood in Wellington and Dufferin counties. Graduating from Orangeville high school and Toronto normal school, he spent a number of years teaching as Assistant Principal of the Orangeville model school and Principal of the Arthur public school and St. George's school, Guelph. Subsequent to this he spent four years in business life in Toronto and Western Canada. Later he took a course at the Ontario Agricultural College, from which he

graduated in 1915. Since then he has been Live Stock Specialist in the Institutes Branch of the Ontario Department of Agriculture and lecturer on Breeds and Breeding at the Ontario Veterinary College. In this work he has been in many sections of the province, and is very familiar with conditions. He is recognized as a specially good live stock man, and his training in this line as well as in teaching should be most useful.

The Kemptville School is being financed entirely under THE AGRICULTURAL INSTRUCTION ACT.

THE CO-OPERATION MOVEMENT

LAMBTON COUNTY

BY W. P. MACDONALD, B.S.A., DISTRICT REPRESENTATIVE

IN Lambton county there are fifty-three farmers' clubs. These clubs are community centres at which farm business is transacted. Social evenings are held when topics of the day and topics of the farm are discussed and debated. The raising of funds for Red Cross purposes and other patriotic works is a work each club undertakes by holding lawn socials and picnics during the summer months. The advantages to be gained by close co-operation, both financially and otherwise, have been plainly evident to the farmers of the county.

With the organization of more clubs the need was felt for a central organization to advise and assist local clubs and co-ordinate their efforts along social, economic and business lines. In response to this need the Lambton County Co-operative Association came into existence. For the purpose of the incorporation of this association under the Ontario Companies Act, letters patent were applied for and granted.

Each member of each farmers' club at the time of uniting with the Lambton County Co-operative As-

sociation gives to the association a promissory note, payable on demand, and renewed every three years, for the sum of twenty-five dollars. The said note is used as collateral security for the transaction of the business of the co-operative association. Any member may demand the return of his note by giving thirty days written notice to the secretary of the co-operative association. Collateral in the form of notes has been secured to the extent of \$15,000. At the annual meeting each member has only one vote.

The co-operative work undertaken by the association up to the present has been entirely the buying of farm supplies in car-lots, such as binder twine, sugar, salt, potatoes, fertilizers wire fencing, cement cedar posts and coal. A business manager was engaged four months ago. Under adverse business conditions a turnover of \$31,000 of business has taken place. Plans are now being worked out to grade, buy and sell all products of the farm. All products sold under the name of the association will be sold on a graded and quality basis.

LEEDS COUNTY

THE co-operative movement in Leeds county had its inception in the year 1912 when one egg circle was organized at Lansdowne. This organization, however, owing to lack of educational propaganda and local objections soon became defunct. A short time later this egg circle was reorganized and since that time the movement, with the support of Mr. W. H. Smith, B.S.A., District Representative of the Ontario Department of Agriculture for Leeds county, has made steady and rapid progress.

Early in the year 1915 pure-bred poultry associations were formed at Athens and Lyn for the purpose of improving poultry and poultry products with a view of securing a higher market price for poultry and eggs. In addition to securing an improved market for eggs, a market was secured for eggs for hatching purposes and for pure-bred poultry for breeding purposes, and eggs for hatching were supplied to members at a reasonable price. The flocks of all association members are inspected by Dominion Government poultry experts, as quality as well as quantity is demanded by the association.

Previous to the organization work done at these centres, an educational propaganda, consisting of egg-candling demonstrations and meetings held throughout the county in aid of the co-operative movement, was conducted through the office of Mr. Smith. As a result of this, the various organizations with centres at Lansdowne, Caintown, Lyn and Athens, were linked together into a selling organization to handle eggs and poultry with executive at Lansdowne.

Following this there was organized the Leeds County Farmers' Co-operative Association, Limited, with an authorized capital of \$10,000, divided into 400 shares of \$25.00 each. The prospectus states that the Leeds

Farmers' Co-operative Association, Limited, has been formed for the purpose of encouraging the production of good quality farm products among the members and others and for securing the best markets available for such products. It is proposed to handle eggs, poultry, hogs, calves, cream and other farm commodities as the business warrants and as the members decide. In the egg trade, it is the present intention to handle new laid eggs only. Under this association, farm products will be marketed from Lansdowne, Lyn and Athens, but the business will be all handled by the one executive with one business manager and a local manager at each point.

In addition to the associations mentioned, independent egg circles are in operation at Crosby and Lyndhurst. However, it is the aim to have the entire county organized into the central organization and doing business under one business manager. In this way Mr. Smith believes that the individual shipping points can take the initiative in various lines of business, but the whole volume of business done will be kept account of through the central association. This means that in the county, all organization work will be in unison, controlled by a systematic body having different phases of operations, systematized and conducted along uniform lines.

Working in harmony and in conjunction with the Leeds County Farmers Co-operative Association, Limited, is the county Board of Agriculture, the executive of which endeavours to deal with problems arising through the co-operative associations, and to furnish the association members with the educational material required to achieve the greatest success along the lines of endeavour undertaken.

The association, in addition to handling poultry products, has purchased many carloads of feed and

grain, clover and grass seed, corn and potatoes.

The work of the egg circles has gradually developed from the selling of eggs to the selling of poultry as well and to the establishment at Athens and Lansdowne of poultry-fattening stations. The method of operation followed is that the birds when bought, are paid for, then fed and fattened, sold, and the profit, over and above the expenses of operation, returned to the association members. This is the method also followed in the handling of eggs and other products. These fattening stations have made rapid progress. Four years ago at Athens, forty birds were fattened and sold. During the winter of 1916-17, four hundred birds or over were handled. In addition to the crate fattening of birds, live poultry, consisting mainly of old hens, was sold at a time when the market demanded them, thus securing for the members the highest

market price. The following figures reveal the progress made in this work, using the Lansdowne centre as example:

	Gross Receipts for Eggs	Gross Receipts for Poultry
1913.....	\$1,850.71	\$ 94.80
1914.....	5,513.99	316.16
1915.....	8,505.76	2,661.65
1916.....	17,207.63	.....

While the gross receipts for 1916 were not available, there was in that year, \$6,184.03 paid to members by the association for poultry. The cost of fattening the poultry purchased amounted to \$834.70. The receipts from this amount of business, at an approximate estimate, would be equal to an increase of one-fifth of the produce price, plus the cost of fattening.

The following table deals with eggs only and shows in a pronounced manner the financial value accruing to the members through co-operative methods:

STATEMENT OF BUSINESS HANDLED IN 1916

CENTRE	Eggs Shipped, Dozens	Gross Value	Net Value	Store Value
Athens	11,401	\$ 3,669.16	\$ 3,325.32	\$ 2,866.89
Lansdowne	51,494	15,327.26	13,286.19	12,511.39
Lyn	2,356	671.50	631.74	590.63
Total	65,251	\$19,667.92	\$17,243.25	\$15,968.91
Net returns over store prices \$1,274.34, or 7.9 per cent.				
Crosby	4,124	\$ 2,529.80	\$2,327.06	\$2,299.17
Lyndhurst	15,048	3,874.19	3,503.79	3,490.67
Total	19,172	\$6,403.99	\$5,830.85	\$5,789.84
Net return over store prices \$41.10, or 8 per cent.				
County.	84,423	\$26,071.91	\$23,074.10	\$21,758.75
Net return over store prices \$1,315.35.				

IN OTHER COUNTIES

The co-operative movement among the farmers is developing rapidly in many parts of the province. Following are extracts from weekly reports of District Representatives that have been received by the Department of Agriculture at Toronto:

HALDIMAND COUNTY

G. H. Woltz:—

Considering the ever-increasing demand for alfalfa seed grown in this district, I devoted a portion of the week endeavouring to get the principal growers in the locality of Windecker to organize themselves into a Seed Producer's Association. While

a co-operative organization is not an easy thing to organize in this district, I believe we will be successful in organizing these seed producers, thus materially raising the standard of seed produced and putting the work on a more sound, economic basis.

A Horse Breeders' Association has been organized at Hagarsville under the presidency of Charles F. Howard and a strong directorate, all of whom are breeders of Clydesdale horses.

The Caledonia Junior Farmers' Association has taken a step in the co-operative purchasing of supplies. At the close of a meeting recently held, orders were given to the secretary by members for thirty-two bushels of kiln-dried seed corn.

ALGOMA COUNTY

A. S. Smith:—

I have been able to inform a great many farmers where they could secure seed. I also located a supply of lime at the steel plant where it is available free of cost. I arranged with farmers beyond hauling distances to secure some carloads of this material which will cost about twenty-five dollars per car delivered. Heretofore these farmers could not secure lime for less than seven dollars per ton.

PORT ARTHUR

L. M. Davis:—

Quite a number of our farmers this year have co-operated in the buying of clover seed which was secured direct from the Kenora Co-operative Clover Seed Association. I induced a seedsman to order a carload of seed oats and organized the farmers in purchasing these, giving the seedsman a profit of five cents per bushel.

HASTINGS COUNTY

A. D. McIntosh:—

The Banner Oats Association disposed of 2,500 bushels of oats for seed purposes and several hundred bushels of other kinds of grain besides clover and timothy seed. The sales were entirely among farmers, some of whom belonged to other counties.

OXFORD COUNTY

G. R. Green:—

I was asked by a representative of the Live Stock Branch at Ottawa to assist in securing three carloads of grade Ayrshire cows. This order was promptly turned over to the secretary of the Southern Counties Ayrshire Breeders' Club, who in the course of a few days had one carload of the cattle in sight. The club officers hoped to be able to fill the rest of the order by the time that the cattle were required.

YORK COUNTY

J. C. Steckley:—

The Farmers' Club at Aurora ordered a carload of seed potatoes which I have assisted them in selling co-operatively.

The first annual sale of the York Holstein Breeders Club was held at Richmond this spring. The average price paid was \$175 for cows and calves.

TIMISKAMING BRANCH

W. G. Nixon:—

The Hagarsville Junior Farmers had an interesting session, over sixty being present to hear the address by F. C. Hart on Co-operative Marketing. This association has won quite a name for itself in the work of co-operative buying supplies but it is now their intention to do some selling as well. This association has a membership of fifty or more, all of whom have signed a note for twenty dollars, which is to be given as security in the transaction of business. The work of the Hagarsville Junior Farmers is having great influence upon the farmers in the district.

THUNDER BAY

G. W. Collins:—

On May 1st our co-operative auction sale of cattle was held with four hundred people in attendance. Holstein cows were most in demand. One grade cow and her calf sold for \$166 and another for \$150. Forty-three head of cattle, including some beef type animals of cows, two-year-olds and yearlings brought a grand total of \$3,830.

CAMPAIGN OF ADVERTISING

BY JUSTUS MILLER, ASSISTANT COMMISSIONER OF AGRICULTURE

AN extensive advertising campaign has this year been inaugurated and carried out by the Ontario Department of Agriculture. The aim of the campaign is to take the results of the work and findings of the various officials of the Department to the farmer in such a way that they will carry conviction, help him in his farm operations and finally bring the desired action which will result in up-to-date methods being followed and in the production of greater and better farm produce.

THIRTY-TWO ADVERTISEMENTS IN SERIES

In planning the details of the campaign much the same procedure was followed as in the case of a commercial advertising campaign. The Ontario farm press was chosen as the logical medium. Contracts were signed for thirty-two back covers of each of six weekly journals, twelve front covers of one monthly publication and twenty-four inside pages of another monthly—all to be used by the end of twelve months, when the contracts expired. Provision was made also for extra pages, if events should warrant more advertisements than those originally planned, and for such limited space as might be used in those journals of a semi-agricultural nature. Although a writer in the Department prepares the advertisements for the press, an advertising agency was brought in to handle the contracts, suggest page lay-outs, and do all routine work. This arrangement with the agency has proven very satisfactory. Another feature which has given excellent results from the first is a monthly conference of the editors of the Ontario farm press with the Commissioner of Agriculture. Topics treated in the advertisements—agricultural problems, indeed, of all

kinds—are thoroughly discussed at these informal meetings and a ground for common action laid down. As a result much good has resulted both for Department and press and a close sympathy and helpful co-operation have been developed.

LITTLE ADVICE—MUCH INFORMATION

In preparing each advertisement the ordinary rules of style and make-up are observed, while two essentials are insisted upon, without which it is felt the advertisements would fail—a knowledge and appreciation of the farmer's viewpoint, and the publication of timely and practical information. It is fully recognized that the same, progressive Ontario farmer has very efficiently adapted his business to his circumstances, that his problems are grave, and that he is quite as patriotic and has served the cause quite as faithfully as has any other class. The ideal striven for is to present accurate figures and reliable facts, to explain as accurately as possible the tendency of markets, to summarize best farm methods; to give, in short, the most practical information available, just when the farmer is likely to want it—and to leave it to his own good judgment to what extent his peculiar, controlling conditions warrant him to apply it. In the fullest possible degree, it is sought to make plain that the idea underlying the advertising campaign and the spirit dominating the work is one of true appreciation of the farmer and his work, and of sympathetic helpfulness.

PERSONAL POINT OF CONTACT STRENGTHENED

In the narrow compass of an advertisement, however, it is not always possible to give very detailed information upon the subject considered. Hence all readers are in-

vited to write the Department of Agriculture directly for more complete information. So that topics for correspondents may be suggested to readers a summary of the chief points discussed are given, when possible, with an invitation to write at once for full details concerning any or all of them. The results, thus far, have been gratifying indeed. Many hundreds of inquiries have been received. Immediately they come in they are turned over to the expert in the Department by whom they would naturally be answered and the information is forwarded at once. This form of extension work is of the very greatest value, as it tends constantly to strengthen the point of personal contact between the farmer and the Department.

The scope of the advertisements upon the programme may be classified under five heads:

(1) The best information obtainable, considering all aspects of the situation, of the various lines of farm industry. In each case present conditions and future probabilities are as thoroughly discussed as the prevailing unsettled conditions permit.

(2) Information concerning the business of farming and most approved farm methods. Summaries are given largely, in this connection, just when the information is most valuable. In a few cases information of especial interest to the housewife is given.

(3) Ways of rendering the critical situation caused by abnormal world conditions less acute are discussed. Such pressing problems as the labour shortage, the greatest practicable utilization of machinery, etc., are the themes of these advertisements.

(4) Advance summaries of bulletins to be published. The idea here, of course, is to place the summarized results of important experiments, or of compilations of valuable information, before the farm public just when it is most urgently required.

(5) Information which can be obtained from the Ontario Department of Agriculture. The object is to acquaint each farmer in the province with the kinds of information he may secure by writing the Department, and just to whom he should write for it. Farmers are urged to preserve these advertisements as a sort of yearly help calendar.

SUBJECTS THAT ARE TREATED

The subjects thus far treated in the campaign have been: the labour situation, value of good seed and proper soil preparation, the horse, dairy, sheep, poultry, apiary and fruit industries, desirability of selling wool co-operatively, advantages of the annual pasture mixture, importance of pure-bred sires, provincial assistance given in draining land, home canning of fruits and vegetables, practical information available at the Ontario Agricultural College, principles of successful marketing and benefits of co-operation, preparation for the 1918 crop and the benefits of, and methods to ensure, pure water on the farm.

The tentative programme for the remainder of the campaign is as follows, in the order given: extension work of the Ontario Department of Agriculture, Ontario Agricultural College advertisement, principles involved in organizing a successful co-operative society, the sheep industry, information available from the representatives of the Department, the beef industry, the Ontario agricultural bulletin service, the bacon industry, O. A. College short courses, bacteria—friends and foes, fertilizers, butter grading, preparation for spring crops, preparing for poultry production, farm power, and water systems for the farm home. This programme may be changed at any time of course, or a greater number of advertisements may be published, as the general situation warrants.

As was before stated these advertisements are published in six weekly and two monthly agricultural publications. They were begun in the last week of March, 1917, and the present contracts expire in March, 1918. The combined circulation of all is approximately 170,000. Thus it can better be understood what a tremendous influence the advertisements may exert, reaching simultaneously, as they do, all the best farmers in the province.

RESULTS ARE THE PROOF

Just how they compare in effective appeal with the most successful commercial advertisements cannot, at present, be determined. But that will be known at the termination of the campaign. An accurate record is being kept of the cost of each advertisement and the number of replies received. These will be compared later with costs and replies in the case of business firms advertising on a large scale and in the same mediums. As in each case the greater

benefits of advertising are indirect the comparison will show, approximately at any rate, the relative appeal of commercial and agricultural advertising. Until that time nothing definite can be said. Yet results thus far have been sufficiently encouraging to warrant the belief that later records will prove agricultural advertising equally as effective—and in point of value received, equally as profitable—as any other kind of advertising carried on in our farm journals to-day.

SHORT CUTS FOR INCREASED FARM REVENUES

THE above is the title of a leaflet that, during the past year, was prepared by Mr. E. P. Bradt, B.S.A., District Representative of the Ontario Department of Agriculture in Dundas County, printed on the office duplicator, and mailed on the 1st and 15th of each month to the young men in the

county who have taken the four to six weeks' course in agriculture. As there are now over one hundred young men in the county who have taken these courses, this method was taken to keep in direct touch with them. The following is an index of the subjects treated in the leaflet during the year:

INDEX TO SUBJECTS AND ISSUE

1. Agricultural Meetings:			
(a) Importance of Attending	Vol. 1, Dec. 15, No. 1		
2. Dairy Cattle:			
(a) Herd Records	" 1, Nov. 15,	" 1	
(b) Winter Feeding of	" 1, Dec. 1,	" 2	
(c) Method of working out balanced rations	" 1, Dec. 15,	" 3	
(d) Fresh Milch Cows, Feeding and Management	" 1, Mar. 15,	" 8	
(e) Avoid turning Cattle out too Early in Spring	" 1, May 1,	" 9	
(f) Summer Feeding of	" 1, Aug. 15,	" 16	
(g) Calves, Proper Care in Summer	" 1, Aug. 15,	" 16	
(h) Stabling during Cold Fall Nights	" 1, Oct. 15,	" 18	
3. Farm Book-keeping:			
(a) A System Shown and Explained in Detail	" 1, Jan. 1,	" 4	
4. Farm Management:			
(a) System Outlined for a 100-Acre Farm	" 1, Jan. 15,	" 5	
5. Farmer's Garden:			
(a) Plans and Varieties of Vegetables to Grow	" 1, Feb. 1,	" 6	
6. Farm Machinery:			
(a) Storing and Care of	" 1, Nov. 15,	" 1	
7. Farm Crops:			
(a) Grain, re Cutting Green for Feed	" 1, June 15,	" 12	
(b) Hay, Time to Cut, Methods of Curing, etc	" 1, June 15,	" 12	
(c) Corn, Cultivation of	" 1, June 15,	" 12	
(d) Timothy Seed, Methods of Growing and Harvesting	" 1, Aug. 1,	" 15	
(e) Clover Seed, Methods of Growing and Harvesting	" 1, Aug. 1,	" 15	
(f) Clover Seed, Methods of Threshing	" 1, Aug. 15,	" 16	
(g) Miscellaneous Crops, Millet, Rape, etc	" 1, June 15,	" 14	
(h) Corn for Ensilage, Proper Maturity	" 1, Sept. 15,	" 17	

8. Grasshoppers:			
(a) How to Control.....	Vol. 1, July 15, No. 14		
9. Poultry:			
(a) Poultry Pointers for Fall and Early Winter	" 1, Nov. 15,	" 1	
(b) Mating up the Breeding Pen	" 1, Mar. 15,	" 1	
(c) Importance of Removing Male Bird	" 1, June 1,	" 11	
(d) Summer Feeding of	" 1, July 1,	" 1	
(e) Handling of Pullets for Winter Layers	" 1, Sept. 15,	" 17	
(f) Fattening Chickens	" 1, Oct. 15,	" 18	
10. Seeds and Seeding:			
(a) Importance of Seed Selection with Results	" 1, Mar. 1,	" 7	
(b) Work of the C. S. G. A	" 1, Mar. 1,	" 7	
(c) Seed Corn	" 1, Mar. 1,	" 7	
(d) Information re Methods of Seeding	" 1, May 1,	" 8	
(e) Seed, Importance of Sowing only Plump Grain	" 1, May 1,	" 9	
11. Spraying:			
(a) Quantities of Material to Use, Time of Application, etc., for Fruit Trees.....	" 1, May 1,	" 9	
(b) Quantities of Material to Use, Application of Spray, etc., for Potatoes.....	" 1, July 1,	" 13	
(c) Orchard and Garden Notes	" 1, June 1,	" 11	
12. Sheep:			
(a) Fitting lambs for Market	" 1, Oct. 15,	" 18	

MANITOBA

DAIRY IMPROVEMENT EFFORT IN NORTH-WESTERN MANITOBA

BY W. R. ROBERTS, DISTRICT REPRESENTATIVE, BINS CARTH

I N STANT response to the call sent forth to have cows tested for butter-fat production would be expected when the simplicity of the operation has been demonstrated. This, however, is not the case in this district, where there are five creameries in operation, one of which claims the largest output of any country creamery in the province.

The farmers of to-day who ship cream find it a very remunerative undertaking, yet they will not take the time to weigh and test the milk of individual cows, so as to improve the herd. Inherent indifference is responsible. With the object of breaking down this indifference, a circuit — seventeen schools — was made in October, 1916. This circuit was covered monthly. The children were instructed how to keep milk records, and how to do the testing for the percentage of butter-fat in a given sample of milk. No less than 500 pupils actually did the work themselves. In this way the parents are reached through their children.

To encourage the pupils still further, they were asked to enter a contest in milk testing, and while the response was not very large, about twenty are doing the work now. This is promising, providing that it is followed up. Those who entered were supplied with composite sample bottles and preservative which they fill during the month. At the end of the month the testing is done with a four-bottle hand tester.

It was found that four-bottle hand testers are adaptable for this kind of work, as the pupils can work in a group of four. Three of these testers are as many as one instructor can supervise effectively. Usually the room in which the work is done is a small laboratory with a limited space. The only essential requisite at the school is hot water. During the winter months when the furnaces are going this is not a task

Additional lectures were given on milk and cream from the standpoint of bacterial growth. The component parts were shown separately so that

an intelligent grasp may be obtained by each pupil in how to prevent abnormal multiplication of bacteria. That souring is due to bacterial life, and that this will take place more readily at certain temperatures, arouses a desire to do things more

carefully, and more important still that pathogenic germs may find admittance to the milk under insanitary conditions is more forcibly impressed on the mind of the pupil. This leads to the need of pasteurizing suspected milk before using.

EQUIPMENT FOR DEMONSTRATION WORK

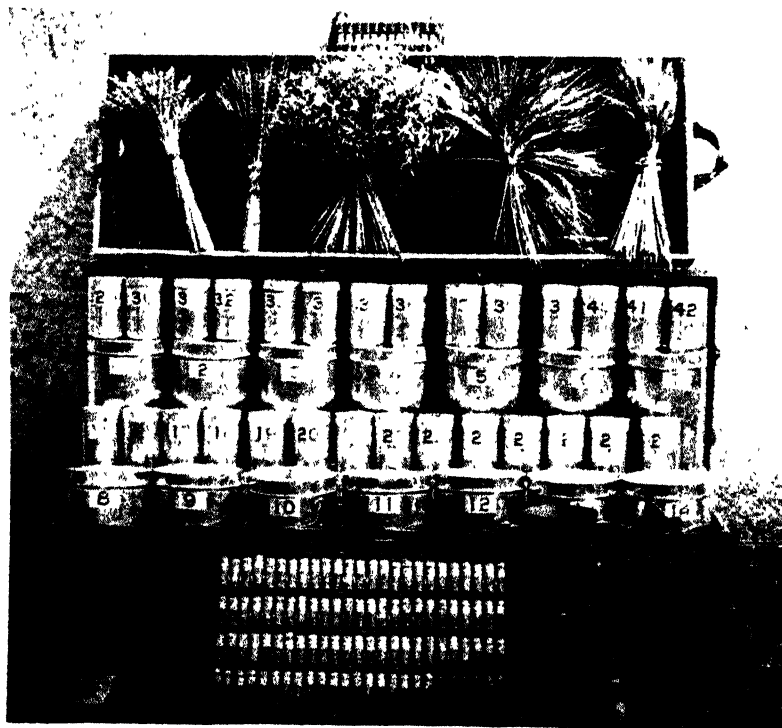
BY J. H. KITELEY, FIELD HUSBANDRY DEPARTMENT, MANITOBA AGRICULTURAL COLLEGE

THE following is a list of the articles included in each of the cans which go with the Manitoba field husbandry short course demonstration trunk. Three of these trunks are used, as the short course work is arranged in three circuits, and the same material goes to about six short courses. The trunk is probably fifteen inches longer than an ordinary trunk and permits everything to be in sight,

with the result that an instructor can obtain any material desired without any trouble.

The case in front of the trunk is one of the collections sent out by the Dominion Department of Agriculture.

The large cans in the illustration are about ten inches long and seven and a half inches wide; the smaller ones are six inches long and three inches wide.



FIELD HUSBANDRY EQUIPMENT TRUNK

This material is used by the Extension Service for Demonstration purposes

SMALL SAMPLES

Fodder Crops:

1. Red Top.
2. Rye Grass.
3. Timothy.
4. Brome Grass.
5. Meadow Fescue.
6. Kentucky Blue.
7. Canadian Blue.
8. Sweet Clover.
9. Alfalfa Grimms.
10. Alfalfa Turkestan.
11. Siberian Millet.
12. Hungarian Millet.
13. Common Millet.
14. North-West Dent.
15. Longfellow Corn.
16. Gehu Corn.
17. Minnesota (13).
18. Field Peas.
19. Alsike Clover.
20. White Clover.
21. Red Clover.

Oats:

22. Gold Rain.
23. Victory.
24. Orloff.
25. Black Victor.

Wheat:

26. Einkorn.
27. Durum.
28. Emmer.
29. Spelts.
30. Club.
31. Polish.
32. Alaska Wheat.

Corn:

33. Preston.
34. Stanley.
35. Huron.
36. Blue Stem.

Barley:

37. Beardless Barley.
38. Hulless Barley.
39. Weed Seeds, mixed.

Flax:

40. Premost.
41. Bolly.
42. Golden.

LARGE SAMPLE

Wheat:

- | | |
|--------------|----------------|
| 1. Marquis. | 4. Marquis. |
| 2. Red Fife. | 5. White Fife. |
| 3. Prelude. | |

Oats:

- | | |
|---------------|--------------|
| 6. Abundance. | 8. Daubeney. |
| 7. Banner. | |

Barley:

- | | |
|-----------------|----------------|
| 9. Two-rowed. | 11. Six-rowed. |
| 10. Six-rowed. | |
| 12. Flax. | |
| 13. Spring Rye. | 14. Fall Rye. |

APPARATUS

1. Seed tester.
2. Score cars—Wheat, Oats, Barley, Flax, Grass.
3. Paper for note work.
4. Paper plates for grain judging.
5. Complete set of Field Husbandry bulletins.
6. The following bulletins:—
Weeds and Weed Seeds.
Smuts in Grain.
Canadian Seed Growers—Report and Regulations.
7. Weed Seed Collection in case.
8. Sheaves of following grains marked on sample sheets—31 sheaves.
9. Six small tripod microscopes.
10. One large microscope.

SASKATCHEWAN

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE

DRY FARMING CONGRESS, PEORIA, ILLINOIS

THE Department of Agriculture has decided to pay return transportation charges on exhibits of merit from Regina to the International Soil-Products Exposition to be held in connection with

the Dry-Farming Congress at Peoria, Illinois, U.S.A., from September 18 to 29. Special cash-prizes are offered by the exposition for threshed grain, grain in sheaf, forage plants in sheaves or bales and other soil products.

BRAND ALLOTMENTS INCREASING

DURING the past year the allotment of new horse and cattle brands showed a considerable increase over those allotted in 1915. There were 1,356 cattle brands allotted, being an increase of 304, while the horse brands allotted were 707, which is an increase of 67 for 1916. In addition to this volume of business there were dealt with in the brand office 90 applications for the transfer of brands; 24 changes in the designs or positions of brands

originally allotted; 22 searches and extracts were made from the brand registers, not including 8 free searches and extracts made for members of the Royal North-west Mounted Police. The number of cattle brands renewed in 1916 was 494, being an increase of 148 over the previous year. The number of horse brands renewed during the same period was 427, being an increase of 21 over the previous year.

WINTER RYE

THE Department of Agriculture has purchased a quantity of North Dakota No. 959 winter rye to supply to Saskatchewan farmers. This seed is put up in two-bushel lots, which is enough to sow 2½ acres, and two bushels will be delivered at any station in Saskatchewan for \$4.

The reasons why, in the opinion of the Department, this crop should be grown in Saskatchewan are as

follows:

1. It is effective in eradicating wild oats.
2. It furnishes better pasturage in late fall and early spring than any grass or other grain.
3. If grown for "hay" it yields abundantly and insures a supply of feed in seasons of drought.
4. It largely aids in preventing drifting of summer fallow and restores fibre to loose soils.
5. It is rust and drought-resistant and is seldom affected by frost.

EXCURSIONS TO THE COLLEGE OF AGRICULTURE

THE farmers' excursions to the College of Agriculture at Saskatoon, extending from July 9 to 14 inclusive, were attended by about 2,200 persons. Lunch was served by the University to their

guests in the judging pavilion, where an address of welcome was given each day by President Murray, and also short addresses by Mr. S. E. Greenway, Director of the Extension Department, by Dean Rutherford,

and by Professors Bracken and Shaw. After these addresses the people were taken to the experimental field, where they broke up into small groups, each in charge of an instructor in field husbandry. Then they were taken to the stock farms, where some 300 head of pure-bred sheep and pigs, and 100 head of pure-bred cattle, mostly of the dairy type, were presented for their inspection. The poultry plant, the mechanics' building, and the greenhouses were also visited, after which the party

dispersed to examine the rest of the University buildings. The same programme was followed each day. As an indication of how much these excursions were appreciated, it may be mentioned that the only district served in former years by an excursion train was the country from Turtleford to North Battleford, and in each year there was an increase in the number attending, until this year 575 passengers were brought to the College.

EXHIBIT AT THE REGINA EXHIBITION

THE Department of Agriculture has a high reputation to maintain for its exhibits, and its display at the Regina exhibition was fully worthy of this reputation. Most of the exhibits had formed part of the equipment of the Better Farming train, which recently toured the province. All of the contents of the Field Husbandry car, nearly all of the poultry, and a large part of the farm machinery displayed on the train were arranged in a tasteful and attractive manner in this exhibit. In addition there was an instructive section showing the perennial sow thistle, its methods of growth and propagation, and the recommended means of eradication.

FARM BOYS' CAMP

One feature of the fair in which the Department of Agriculture is particularly interested is the Farm Boys' Camp, which was held this year for the third time. This camp stands as a monument to the originality of the late Lieutenant H. N. Thompson, formerly Weeds and Seed Commissioner. The great value of these camps has been so thoroughly proved and generally recognized that there is no doubt that a Farm Boys' Camp will be a permanent feature at all future exhibitions. This year there were some 250 boys in attendance, some fifty rural municipalities

or agricultural societies being represented, the whole being under the control of Mr. J. G. Raynor. Every moment of the boys' time from morning till night was taken up by judging competitions, lectures, demonstrations, or inspecting the exhibits. Recreation was not neglected, but was ably attended to by Mr. McLeod of the local Y.M.C.A. staff. Many of the professors of the College of Agriculture greatly assisted in the daily programme of lectures, and the boys were also addressed by Mr. F. H. Auld and others.

THE WOOL EXHIBIT

The main idea in the wool exhibit, as prepared by the Co-operative Organizations Branch, was to show not only the various classifications and grades, but to illustrate the best methods of handling, so as to secure the advantages to both producer and buyer. The bad effects of the use of insoluble paints, the deteriorating effect of the use of binder twine, the injurious effect of shipping wool while wet, or allowing it to become damp subsequently, were all exemplified. Two large cases were shown containing samples of fleeces of the most important Canadian breeds, together with other samples illustrating character and staple.

CATTLE FOR DISTRIBUTION

A noteworthy feature was the exhibit of a number of grade heifers, which were samples of the animals being supplied to farmers under the Live Stock Purchase and Sale Act. There was a constant stream of visitors inspecting these animals and literature and information was given regarding the Department's plan for supplying live stock on credit terms. It is now possible to secure 10 grade heifers and a pure bred bull for a cash outlay of about \$350, with plenty of time for the balance, and interest at only six per cent.

THE DAIRY EXHIBIT

Owing to military requirements

it was not possible for the dairy exhibit to secure quarters at the fair grounds. At the cold storage warehouse, however, there was a really excellent display. One hundred and thirteen different lots were shown, and the creamery butter in particular was very uniform. Hon. Mr. Motherwell's silver trophy for the highest average score in creamery classes went to the Carlyle Dairy of Calgary. The championships for the different provinces for the winners of the highest total score in the three creamery classes were: for Saskatchewan, Geo. H. Carter, Moosomin; for Alberta, Carlyle Dairy Co., Calgary; for Manitoba, Crescent Creamery Co., Winnipeg.

THE DESTRUCTION OF GOPHERS

BY M. P. TULLIS, ACTING WEEDS AND SEED COMMISSIONER

THE destruction of gophers in Saskatchewan by poisoning has not been successful in reducing their numbers to any great extent throughout the province generally. This is due particularly,—first, to lack of community co-operation in distributing the poison at the proper time, and, second, improperly prepared bait. With a view to overcoming the loss from the lack of co-operation a Gopher Day was suggested. May first was decided upon, as this date was considered early enough in the season to destroy the gophers before the young appear and before any new growth would be far enough advanced to be more palatable than the poisoned food.

Municipalities, farmers' organizations and school teachers were asked to bring about general observance of the day. Responses were received from quite a number of municipal councils indicating that they were alive to the seriousness of the gopher pest and in some cases stating that bounties were being offered of from 1 to 2½c. for each tail secured. A number of the municipalities put up special prizes to encourage the boys and girls to help in the work of des-

truction. The Department offered 36 bronze shields and 36 bronze medals for competition among the school children. For the purpose the province was divided into 37 divisions of about 8 municipalities each and a bronze shield was presented to the school district with the highest points in each of the 36 of the divisions. The school in the other division standing highest in the whole province got a silver shield. Points were allowed for the average as well as for the aggregate number of gophers destroyed. This gave schools with a small number of children in attendance an equal chance with the others. The boy or girl in each of the 36 of the divisions who presented the largest number of tails to the teacher up to the evening of May 1st got a bronze medal. To the boy or girl highest in the province a gold watch was presented by Mr. F. H. Auld, Deputy Minister of Agriculture.

Gutenberg S. D., near Tramping Lake, was the winner of the silver shield with a total of 7,632 gophers destroyed, while Master Christian Reiter of the same school was the winner of the gold watch with 2,092

gophers. Quite a number of boys and girls in the province ran a close second, having secured nearly 2,000 tails. Nine hundred and eighty schools entered the competition and a total of 514,140 gophers were reported destroyed or an average of 524 per school.

The half million gophers destroyed by the children this spring is equal to two and a quarter millions in July or August and calculating that each gopher destroys ten cents worth of grain per season this means that the boys and girls of Saskatchewan saved over \$200,000.

Realizing the value of the help of

the children a Junior Agricultural Service League is being organized into which about 4,000 children will be admitted to membership. To qualify the children are asked to destroy 50 gophers. When 200 are destroyed a member is admitted to the third rank. Five hundred allows admission to the second rank and 1,000 to the first rank. A bronze medal will be given November 1st to the boy or girl standing highest in the league in each division as outlined by the gopher competition. A silver medal will be given to the one standing highest in the province on that day.

BETTER FARMING TRAIN

BY W. W. THOMSON, DIRECTOR, CO-OPERATIVE ORGANIZATION BRANCH

SASKATCHEWAN'S fourth annual Better Farming train completed a very successful itinerary on Saturday, June 30th. The eleven cars used for lecture and demonstration purposes were placed at

Regina-Arcola branch; the Estevan branch from Gainsboro west, and the Soo Line from Estevan to Drinkwater. All told the train made stops at alternate points over 750 miles of railway and was visited by upwards



THE BETTER FARMING TRAIN

the university siding, Saskatoon, early in the last week of May and all the equipment was installed by June 2nd. On Monday, June 4th, the train commenced its journey, which covered the Loverna and Battleford branches of the Grand Trunk Pacific Railway, also the Grand Trunk Pacific main line from Bradwell to Melville, and then transferring to the Canadian Pacific lines covered the

of 19,000 persons during the four weeks that it was on the road.

The train differed from those operated by the Department in previous years in two important points. 1st, —the rolling stock was supplied jointly by the two railways over which it operated, which obviated all necessity of transferring equipment when changing over from one railway to the other, and, 2nd, —a much

larger equipment of demonstration material was carried and more time devoted to the explanation of the exhibits than formerly.

The train consisted of the following sections which we will briefly describe in the order named. Live stock section, poultry section, machinery, buildings and dairy section, boys' and girls' section, crop production section, household science section, and nursery section.

The live stock section occupied

work and was ably assisted by Messrs. H. Sommerfeld and W. A. Kirkpatrick, two ex-students from the provincial College of Agriculture.

The poultry section occupied a day coach from which all seats had been removed. A portion of the car was fitted up as a model poultry house and this was contrasted with another part fitted up to illustrate the very poor accommodation frequently reserved for the poultry on many farms. Representative specimens of the



DEMONSTRATION IN TYPES OF CATTLE

The car is used as a demonstration platform

two large machinery cars and two flat cars with canopy roofs. The machinery cars were used to house a comprehensive display of both beef and dairy cattle. A pure-bred Clydesdale mare was also carried on one of these cars. One of the flat cars was divided into pens to carry sheep and swine, and the other flat car was used as a platform on which to display the live stock for demonstration purposes. Prof. W. H. J. Tisdale had charge of the live stock

breeds of poultry most suitable for Saskatchewan were shown, some in the houses above described and others in coops carried for the purpose. An incubator was shown in operation, and also a brooder. A number of chickens were shown in a fattening crate, and demonstrations were given in proper methods of killing and plucking chickens and in candling eggs. Prof. R. K. Baker had charge of this section, and he and his assistants, Messrs. E. Lloyd, V. S.

Asmundson, and J. E. Kratzert, were kept very busy explaining the equipment and discussing poultry problems.

The mechanic, building and dairy section occupied two large express cars. The equipment consisted of model farm buildings, designed to show conveniences in arrangement and combined with a proper system of lighting and ventilation. Two electric lighting plants suitable for farm use were shown in operation, as was also a gasoline engine fitted up with a line shaft to drive a churn, washing

The boys' and girls' section occupied a day coach which had been fitted up so that it could be used for illustrated lectures and for motion pictures. Prof. F. W. Bates, Director of School Agriculture for Northern Saskatchewan, was in charge of this department and was assisted throughout by F. Bradshaw, Chief Game Guardian for the province, who gave very interesting lectures on the bird life of Saskatchewan, and on questions connected with game preservation. The motion pictures put on with a Pathescope machine were



THE STAFF OF THE BETTER FARMING TRAIN

Front Row—Left to right: Mrs. Jean Archibald, Miss H. Genry, Miss C. Murray, Miss Gillespie, Mrs. L. E. Kirk, J. E. Kratzert. Kneeling: John Cameron, Prof. R. K. Baker, W. Thompson. Standing: Prof. J. McSmith, Mr. Jarvis, John Rayner, Prof. T. N. Willing, E. A. Lloyd, Jno. McKenzie, Mr. Summerfeldt, C. Morrison, Mr. Bradshaw, Mr. Cox, Mr. Hanson, Prof. J. Tisdale, Mr. Mutch

machine, cream separator, etc. Several cream separators, a Babcock milk tester with scales and other equipment for keeping records of milk production, also sanitary milk pails, cream cans, etc., were shown in the dairy section. Prof. J. MacGregor-Smith had charge of the mechanical section. Prof. K. G. Mackay demonstrated with the dairy equipment and discussed dairy problems with the visitors, while Messrs. MacKenzie and E. C. Jarvis explained the other equipment.

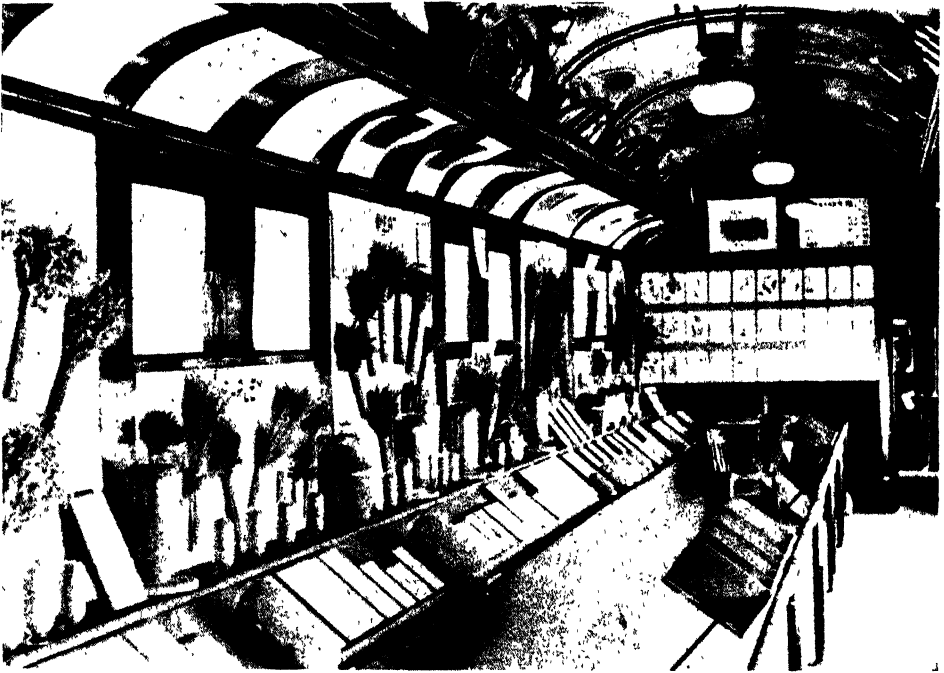
another interesting and instructive feature. The films used were largely travel scenes, showing scenery in various parts of Europe, Africa and America. Two natural history films were also used, and the programme was usually concluded with a comic feature.

The crop production section, which was naturally one of the most important departments of the train, was also housed in a day coach from which all the seats had been removed. Exhibits of desirable varieties of all

of the important field crops grown in the province were tastefully displayed, and a plentiful supply of placards and photographs with suitable inscriptions served to impress important cultural truths on the minds of visitors. The display was divided into three sections, one for cereals, one for fodder crops and one for weeds, each in charge of a demonstrator especially qualified to deal with his particular subject. The demonstrators discussed prob-

by various members of the Field Husbandry staff of the Agricultural College.

The household science department occupied a day coach. A large platform had been erected at one end, and on it were shown a number of up-to-date household conveniences, such as the latest thing in coal-oil stoves, a convenient refrigerator for a farm home, a convenient form of kitchen sink, and an improved mangle for laundry purposes, etc. Mrs. Jean



THE CROP PRODUCTION CAR

lems in connection with their work in a conventional way with persons who visited the car. Lectures on cultural matters and on farm machinery and buildings were given as in former years in a lecture car; but this year a special effort was made in all departments to impart information by having the demonstrator in charge of exhibits answer individual queries. Prof. John Bracken was in charge of the field crops section, and was assisted throughout the itinerary

Archibald was in charge of the women's department, and gave lectures on questions connected with home lighting, heating, ventilation, etc. Miss Gladys Henry, her assistant, gave demonstrations on the preparation of deserts and other culinary matters. The programme in this section also included lectures on poultry raising and dairying by Professors Baker and Mackay.

The nursery section occupied another day coach from which prac-

tically all of the seats had been removed, and which was fitted up with a slide, a sand box, and a plentiful supply of toys. The object of this section was to provide a safe place for parents to leave small children while attending the lectures in other parts of the train. This feature seemed to be much appreciated, and the car was well patronized at every stop. The ladies in charge were Mrs. L. E. Kirk, Miss J. Gillespie and Miss Christina Murray.

Two points were visited each day, and identical programmes were put on at each place. The following is an outline of the regular morning programme:—

- 9.00 a.m.—Train open for inspection of visitors.
- 9.30 a.m.—All visitors assembled at the live stock car and the Department's representative in charge of the train briefly explained the objects of the train and how it had been provided, including assistance received from the railway companies, and the College of Agriculture.
- 9.40 a.m.—A short lecture particularly for the boys and girls on types of cattle.
- 10.00 a.m.—Lectures for women commence in the household science car and continue until 12.00 noon.

Boys' and girls' lectures commence in the lantern car. Men remain at the live stock car until 11.00 a.m. for further lectures on live stock.

- 11.00 a.m.—Men go to car provided for the purpose where lectures are given on field husbandry from 11.00 to 11.30 a.m. and on farm mechanics from 11.30 to 12.00. At this hour the boys and girls commence a tour of inspection of the display cars and return to the lantern lecture car at 11.45 for motion pictures. From 12.00 to 1.30 p.m. the entire train is open for examination and explanation of display material.

Mr. J. G. Raynor, District Representative of the Department in the Battleford district, was in charge of the train throughout and reports a most satisfactory itinerary. The attendance was: men 6,050, women 4,586, children 7,333, and infants 1,870. This large attendance was doubtless due to the cumulative effect of the advertising of other years, together with the fact that the train was undoubtedly the best equipped for its purpose which the Department has ever sent out.

The operation of this train is made a possibility through the provisions of THE AGRICULTURAL INSTRUCTION ACT.

PART III

Rural Science

NURSERY STOCK FOR SCHOOL PLANTING

NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR RURAL SCIENCE SCHOOLS

THE question of a nursery to supply shrubs and other plants for school grounds is worth pushing.

Thus far in Nova Scotia we have none. The Agricultural College grows a considerable quantity of shrubbery for its own use; but it has not given any to schools. There is not sufficient ground under control

of the Education Department to grow material for distribution. Our Normal College has less than two acres of ground, with no chance to enlarge its area.

From the other provinces we hope to learn some method of supplying our schools with desirable material without having to buy it from private nurserymen.

NEW BRUNSWICK

BY R. P. STEEVES, M.A., DIRECTOR ELEMENTARY AGRICULTURAL EDUCATION

WE have no provincial schools nursery. The trees and shrubs that have been used for beautifying school grounds have in the past been obtained from local sources—from the forest or from the grounds and gardens of interested citizens. In only a few cases, so far as I am aware, has purchase been made by the trustee boards.

Within recent years, as introductory work, this Division has supplied school districts in which our work is being specially taken up with shrubs and vines as samples. We have thus hoped to encourage both teachers and trustees in a desire to make greater use of this way of increasing interest in school-ground improvement.

This year, through the kindness and courtesy of Mr. W. W. Hubbard, Superintendent of the Dominion Experimental Station, Fredericton, over three hundred excellent specimens of flowering shrubs have been distributed to our schools. I have reason to know that these are greatly appreciated.

I think the schools nursery an excellent idea that should greatly promote beautification of school grounds. When our agricultural schools get into regular service and sufficient land is available at one or both for this purpose, I have no doubt but that the schools will wish to avail themselves of the opportunities such a nursery would afford.

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

THERE is no special provision made in Ontario to supply nursery stock of forest trees or shrubs for the ornamentation of school grounds. Where school boards are desirous of obtaining such material, they are expected to secure it either from near-by woods or swamps, or from regular nurseries. Where the schools are maintaining

classes in agriculture, a portion of the grants apportioned to the board for equipment may be used to purchase trees, shrubs, or perennials. In schools where agriculture is not taught (the subject is optional) according to the prescribed regulations of the Department of Education, no financial assistance is received for this purpose.

MANITOBA

BY R. FLETCHER, DEPUTY MINISTER

FOR some years past we have received annually a considerable number of trees from the nurseries on the Experimental Farm at Indian Head. These we have distributed, free of cost, to school boards in districts where the ground had been cultivated the previous year at

least, and, therefore, there was some chance that the material would thrive. We have just reached the stage where we can supply considerable material each year from the nursery at our Normal School grounds at Brandon.

BY B. J. HALES, B.A., LL.B., PRINCIPAL OF NORMAL SCHOOL, BRANDON

FOR some years past there has been some distribution of nursery stock by the province, but it was largely material received from the forestry nurseries at Indian Head or from other sources. For the last year or two we have supplied a part of it. In connection with our forestry instruction in the Normal School, we have found it necessary to grow a considerable number of trees and shrubs, while in our horticulture we have found it necessary to grow quantities of herbaceous perennials. This year it was decided that all the distribution should be from the Normal School, and that it should be confined to material of our own growth. As part of the old arrangement I received a shipment of seedlings from Indian Head, but they were not

distributed this year. We planted them in our own nurseries and will have them for future distribution.

In order to reach the teachers and school boards we inserted in the February copy of the *Western School Journal*, published in Winnipeg, the following announcement:—

"The Department of Education will be prepared, next Spring, to distribute a limited quantity of trees, shrubs and herbaceous perennials to those schools which have grounds in a condition for planting. This material has been raised on the grounds of the Brandon Normal School in connection with the instruction in gardening and forestry, and as it must be removed to make room for further work, it is being distributed free to schools, the school district paying the express. The distribution will be made directly from the Normal School in Brandon and all applications should be addressed to the Principal.

"The quantity of material available for distribution in the spring will be con-

ditioned somewhat upon how it stands the winter. Under ordinary conditions it should be about as follows:

TREES AND SHRUBS

- 375 Manitoba Maples, 3 ft. high.
 - 500 Manitoba Maples, 2 ft. high.
 - 600 Lilac, 2 to 3 ft. high.
 - 250 Laurel Leaf Willow, 2 ft. to 3 ft. high.
 - 500 Golden Willow, 2 ft. high.
 - 50 Russian Poplars, 5 ft. high.
 - 2,500 Caragana, 2 ft. high.
 - 20 Red Elder, 2 ft. high.
 - 300 Virginia Creepers, last year's cuttings.
- Cuttings of willow and poplar can also be supplied where desired.

always more or less uncertainty about this class of material wintering well the composition of the collections cannot be definitely promised, but so far as conditions will allow, the following collections will be distributed:

NO. 1. BIENNIALS

- | | |
|--------------------|-------------|
| 10 Sweet Williams. | 3 Dianthus. |
| | 5 Pansies. |

NO. 2. PERENNIALS

- | | |
|---------------------|--------------------|
| 10 Iceland Poppies. | 2 Shasta Daisies. |
| 3 Dahlias. | 3 Achillia, white. |
| 2 Ribbon grass. | 2 Golden Glow. |



FORESTRY NURSERY, NORMAL SCHOOL, BRANDON, MANITOBA

HERBACEOUS PERENNIALS

- 300 Dahlias.
- 600 Golden Glow.
- 100 Anthemias.
- 300 Sweet Rocket.
- 100 Columbines.
- 100 Larkspurs.
- 300 Scarlet Lychnis.
- 20 Bleeding Hearts.
- 100 Bridal Robe.
- 100 Gypsophila.
- 500 Variegated Ribbon Grass.
- 300 Campanula Compacta.

BIENNIALS

- 100 Sweet Williams.
- 500 Pansies.
- 300 Dianthus.

"To avoid confusion, both in ordering and filling the orders, the perennials and biennials will be made up in a number of standard collections and each school may order the collection of biennials and one of the perennial collections. As there is

NO. 3. PERENNIALS

- | | |
|---------------------|--------------------|
| 1 Bleeding Heart. | 1 Gypsophila. |
| 2 Golden Glow. | 5 Columbine. |
| 5 Larkspur. | 5 Scarlet Lychnis. |
| 5 Dwarf Campanulas. | |

NO. 4. PERENNIALS

- | | |
|--------------------|-------------------|
| 3 Anthemias. | 1 Bleeding Heart. |
| 3 Bridal Robes. | 2 Columbines. |
| 2 Larkspurs. | 2 Dahlias. |
| 1 Golden Glow. | 2 Ribbon Grass. |
| 5 Scarlet Lychnis. | 5 Sweet Rocket. |

"There can also be supplied about forty bushels of choice seed potatoes of the following distinct varieties:

- | | |
|------------------|--------------|
| American Wonder. | White City. |
| Carman No. 3. | May Queen. |
| Bovee. | Honey Eye. |
| | Crown Jewel. |

These will be distributed in five-pound lots.

"School Boards or teachers requiring any of this material would do well to put in

their applications as early as possible as all orders will be filled in the order received and there might not be sufficient available material for all."

In answer to this announcement orders poured in, and at the proper time the trees and shrubs were distributed on the terms indicated therein. The quantities mentioned in the announcement were intentionally kept somewhat below what we were able to supply in order that the requests might not too much exceed our supply.

We distributed to 127 elementary and high schools throughout the province about 9,000 trees and shrubs, 1100 willow and poplar cuttings, 189 collections of herbaceous perennials or biennials, and 32 bushels of seed potatoes. We have restocked our nursery with seedlings and cuttings, and will be in a position to distribute at least an equal quantity next year.

It will be seen that this work with us is merely in a stage of growth.

There will be some changes in detail perhaps next year, but the distribution will no doubt be along the same lines and carried on in much the same way as this year. I am convinced that this is a department of school work which is capable of very great development, and am glad to know that similar work is being done in other provinces, because that will stimulate effort here. It was begun with us purely as a by-product of our Normal School work, but with little expense we can make it an integral part of our effort.

The only condition necessary for a school to receive this material is that it has ground prepared for the planting. We are anxious, as far as possible, that this material should find its way into the poorer schools, and a gratifying feature of this year's work is that a large percentage of the schools to which distribution was made were in the outlying districts of the province.

SASKATCHEWAN

BY A. W. COCKS, B. SC., DIRECTOR OF SCHOOL AGRICULTURE

MOST of the rural school grounds in the southern part of Saskatchewan are desolate and uninviting in appearance. In most cases no attempt has been made to improve conditions, and with the exception of the school building there is nothing to indicate any effort on the part of man to change the natural appearance of the prairie. Although the cultivation of trees and shrubs is a fairly simple matter, yet this fact is not generally known, and many school trustees and ratepayers on the prairie are of the opinion that it is useless to attempt to establish windbreaks, shelter-belts, or tree plantations.

Recognizing the necessity for more beautiful surroundings for the schools, the Directors of School Agriculture made arrangements in 1915 with the Chief of the Tree Planting Division,

Forestry Farm, Indian Head, and with the Provincial Nurseries, Regina, for the free distribution of trees and shrubs to school districts. The school officials are asked to properly cultivate the ground, to make application for trees and shrubs at least a year before planting, and to submit a complete statement of the work done on the land, a plan of the school grounds and an agreement to properly care for the trees and shrubs after planting. Applications are forwarded and the above information supplied to the Directors of School Agriculture, who, by inspection of the ground or otherwise, will satisfy themselves that the ground has been properly prepared before forwarding the list of applications to the Forestry Farm or the Provincial Nurseries.

By means of lantern slides illus-

trating the possibilities of tree planting on the prairies and by the distribution of circulars published by the Department, considerable interest in the improvement of school grounds has been aroused. Usually, however, it is found that there is a tendency to attempt to obtain results too quickly. On the prairies of Saskatchewan two seasons should be devoted to the preparation of the

ground, the second season being devoted to deep summer fallowing.

In the spring of 1916, 54 school districts were supplied with trees from the Forestry Farm, Indian Head, and 18 with shrubs from the Provincial Nurseries, Regina. In the spring of 1917 trees were forwarded to 56 school districts, while 25 schools received shrubs.

ALBERTA

BY JAS. C. MILLER, B.Sc., Ph.D., PROVINCIAL DIRECTOR TECHNICAL EDUCATION, DEPARTMENT OF EDUCATION

THERE is no special provision for supplying nursery material for planting on school grounds in this province, apart from the Dominion Experimental farms at Indian Head, Lacombe and Lethbridge. The C.P.R. nursery at Cluny

and Archie Mitchell's nursery at Coaldale furnish much of the material used.

There is need for further provision along these lines, and a more active forestry policy in the Prairie Provinces.

BRITISH COLUMBIA

A PROVINCIAL SCHOOLS NURSERY

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION, VICTORIA, B.C.

IN 1914 the Department of Education for British Columbia adopted a policy whereby school boards wishing to undertake a scheme of school grounds improvement would receive financial assistance as well as free advice and a supply of ornamental trees and shrubs. For several years the Provincial Government had been supplying ornamentals for the beautifying of its own public grounds in various parts of the province, and for this purpose had established a large nursery in connection with the grounds of the Mental Diseases Hospital at Essondale, adjoining the Government farm. As in other places so it was found here that this horticultural work and the new and healthful interests associating with it had a most beneficial effect on the

men engaging in it. On the other hand, it made possible the production of large quantities of valuable trees and ornamental shrubs at a very low cost.

In the fall of 1914 it was found that the supply of nursery stock on hand was more than sufficient to meet the needs of grounds in connection with provincial public buildings, and it was decided to make donations to school boards entering into an agreement with the Department of Education. This agreement provided for the complete planning, grading, draining, surfacing and planting of the school grounds, and was included as part of the work of the Director of Elementary Agricultural Education. In two years in the neighbourhood of sixty school grounds have been planned and most of the im-

provements carried out, including the planting of native trees as well as many beautiful horticultural varieties supplied from the schools' department of the Provincial Government nurseries.

movement was made in the spring of 1915 to provide for larger future demands by starting many of the best varieties of Canadian trees from seed, and also in 1916 by purchasing at a very low cost several thousand



A CORNER OF THE PROVINCIAL NURSERY

As it takes from five to ten years to raise most varieties of trees to a size fit for permanent planting, a

three and four-year seedlings which were set in the nursery and will be available for distribution from year



A VIEW OF THE PROVINCIAL NURSERY, ESSONDALE, B.C.

to year whilst the younger seedlings are coming on.

It is the intention of the Department to give more attention in future to the propagation of the best trees

province. To this end a campaign has been started in the schools of the province with a view to interesting the teachers and pupils in the flora of their own respective districts.



TREES IN PROVINCIAL NURSERY READY FOR DISTRIBUTION TO SCHOOLS

and shrubs which are native to British Columbia, not only in the provincial schools' nursery at Esson-dale, but also in other parts of the

Teachers conducting school gardens are asked to include in each garden a forestry plot or bed for the propagation of native species from seeds



CHOICE EVERGREENS IN THE PROVINCIAL NURSERY

and cuttings. During the past year some schools have done excellent work along this line. In this way it is hoped that the schools of the province will soon take on not only a much improved appearance, but also a truly national character, both as to teaching and general external setting.

We also advocate that cities and municipalities having several schools to provide for should establish small nurseries for the supplying of suitable

the schools in Vancouver City, and also in one of the schools in the municipality of South Vancouver.

Most of the provinces in Canada have adopted the policy of supplying free to schools many of the text-books used by the pupils. It is our intention in British Columbia also to supply in a similar manner that which will make school life more pleasant and less monotonous—good playgrounds, carefully planned, well equipped and liberally furnished with



SCHOOL GREENHOUSE, GEORGE JAY PUBLIC SCHOOL, VICTORIA, B.C.

In addition to starting early plants for their own school garden, the boys and girls of this school start thousands of plants from seeds and cuttings which are sold to the School Board for the purpose of supplying other school grounds and gardens in Victoria.

trees, shrubs and perennial flowers in quantity. Such a school nursery in a city or rural municipality might be directly connected with one of the larger schools. In this way the pupils of such central school would be able to do at least part of the work and would have no small advantage from an educational standpoint as a result of this. Already a move has been made along this line in connection with one of

our best Canadian trees and flowering shrubs. Our provincial schools nursery helps to make this possible.

It should be stated here that the first three centres are those selling under one business manager, while the two last in the table work independently. The advantages of the larger organization, in Mr. Smith's estimation, are that the cost of marketing becomes less through the larger number of eggs and the larger amount

of the products marketed. Funds are also provided by means of which cash is paid to the member when eggs or other products are delivered. This makes possible more careful selection than is possible when farm products are delivered one week and not paid for until the next.

The experience of Mr. Smith in his co-operative efforts has proved the need for educational work along the lines of production and marketing in a strictly business manner and that to secure the highest prices only produce grading number one should be offered for sale.

ONTARIO

SCHOOL FOR RURAL LEADERSHIP

FOR the last three summers the Ontario Agricultural College has held a summer school for rural leadership. The first two sessions were full of helpful suggestions and aroused much enthusiasm. The number in attendance, however, was not what it should have been. This year the condition of affairs has been changed. The attendance trebled and there were 120 who registered and attended the sessions of the school from July 23rd to August 4th; 80 of them were clergymen and the remainder clergymen's wives, school teachers, women's institute officers, etc. The work taken up included a course of 10 lectures on the Rural School. Mr. H. W. Foght, Specialist in Rural School Practice, Bureau of Education, Washington, D.C., was the lecturer. He took up and dealt with the school from the standpoint of curriculum, teacher, equipment, administration, etc. While his lectures led up to and ended with a strong case for consolidation of schools, he dealt in a splendid way with the possibilities of the little one-roomed school under proper direction, with a "Brown Mouse" teacher and a community building viewpoint. These lectures were attended by 280 rural school teachers, as well as the clergymen, etc., and from the enthusiastic reception Mr. Foght's lectures received we feel sure that much good will result. The following are the subjects of Mr. Foght's lectures:

1. The rural problem analyzed in relation to its educational, social and religious elements.
2. Institutional means for remaking rural life.
3. The farmer's wife, a vital factor in the problem.
4. The teacher and community leadership
5. The complete rural community school (illustrated)
6. Good roads and education (illustrated).
7. What every teacher can do for this advancement of vocational education (illustrated).
8. The meaning of modern sanitation in school and home.
9. The teacher and the play-life of the school (illustrated).
- 10 The revitalized course of study for rural schools.

A second course given was "Community Leadership" by A. Maclaren, B.S.A., Lecturer in Rural Sociology, Ontario Agricultural College, Guelph. The subject was dealt with from the following viewpoints,—the goal in rural life; rural mindedness—discovery, enlistment and training of leaders; methods of training; Canadian standard efficiency tests; boys' and girls' camps; problems in rural life; avenues of service demanding leadership, etc. These lectures were accompanied by practical demonstrations in three or four ways. An athletic meet was run off on a new standardized basis, in which 303 out of 330 eligible competitors competed. Miss Jean Austen directed a children's open-air play, "Bird Guardians," with the object of illustrating

its possibilities in training children in self expression. A group of students and members of the college staff presented Dickens' "Cricket on the Hearth" as a suggestion for the use of drama in developing leadership, and lastly, a group of rural school teachers presented the pageant "The Call of the Country". This last event summed up in a very striking, impressive way the call for leadership, and the answer to it.

Besides these special events group and team games were organized between lectures, from 4 to 6 p.m. and in the evenings, for the purpose of encouraging the playing of games in rural districts as a means of developing latent possibilities.

This second course was followed by a series of seminar periods during which a lively discussion was entered into regarding "the message and mission of the country church": "methods of conveying the message and mission"; church organizations and their functions, church finances, business administration.

In the afternoons lectures were given covering the technical side of

agriculture, including vegetable gardening, home grounds decoration, dairying, poultry, field husbandry, co-operation, marketing. The ladies had special sessions in cheese making, butter-making, women's institute work, medical inspection of school children, etc.

As a result of the summer school there was organized the "Ontario Rural Community Life Movement". The purpose of this organization is to promote the highest ideals of rural community life, religious, social, educational, physical and economic. It has quite a large programme in view, but two of the outstanding things for this year are the promotion of four district community life conferences, 2½ days' duration each, covering old Ontario; then we intend approaching the educational boards of the various theological colleges to try to have a more thorough course given in rural life interests, economic, social, etc., so that theological students may be more thoroughly prepared for the problems they will meet when they take a position in a country church.

MANITOBA

SHORT COURSE FOR RURAL MINISTERS

BY R. W. MURCHIE

FORTY-FOUR ministers and sixteen ministers' wives registered for the third annual short course in agriculture and rural sociology held at the Manitoba Agricultural College from Monday, July 30th, to Saturday, August 11th. The fact that eight of the sixty students have been in attendance at all three courses, and that twenty-four have returned for a second course, is proof of the helpfulness and popularity of the school. Three new departures were made this year—by the arranging of a systematic course extending over three years, and by the provision of separ-

ate classes for women in the afternoon, and options for men.

The whole class attended the morning lectures, when Principal B. J. Hales, B.A., of Brandon, gave a series of addresses on "The Rural School." Beginning with a short history of education, Principal Hales led up to the ideal education, defining the aims of the educational authorities of Manitoba. These lectures provoked lively discussions, and will no doubt stimulate a sympathetic interest in educational affairs amongst the rural ministers. Principal Hales was eminently fitted to conduct this course, for the pro-

gress which is being made in rural education in Manitoba is due largely to his enthusiasm, experience, and breadth of vision.

Four lectures on extension work were given by Mr. S. T. Newton, Superintendent of Agricultural Extension in Manitoba. Mr. Newton explained the provisions of THE AGRICULTURAL INSTRUCTION ACT, and showed how these were being carried out in Manitoba, especially referring to the boys' and girls' clubs, which now have a membership of

on soil cultivation, seeds, varieties and storage.

In the forenoon Professor E. M. Eadie, of the Household Science Department, gave a course in home nursing to the ladies, and two demonstrations in home nursing were also given.

The men's class was divided in the forenoon, a few taking the poultry husbandry option under Professor M. C. Herner, B.S.A., while the majority elected to take the course in gas engines and automobiles with



A GROUP OF THE STUDENTS ENROLLED IN MINISTERS' SHORT COURSE, MANITOBA AGRICULTURAL COLLEGE, 1917

16,000, and to the short courses in agriculture and home economics which have been so successful in rural centres in Manitoba.

Mr. R. W. Murchie, of the College staff, gave a course of lectures on "Rural Recreation," tracing the history of the play movement, and giving practical demonstrations in team games and organized play.

One hour each forenoon was given up to gardening, when Professor F. W. Brodrick, B.S.A., lectured in an interesting and instructive manner

Professor Lawson Shanks, B.S.A. Many of the clergymen in Manitoba are finding it convenient to use the automobile for pastoral work, and all are alive to the importance of gas tractors and gas engines in the field and in the farm home. Professor Shanks gave a very thorough course and, having at his disposal the whole afternoon, he was able to include a goodly amount of practical work, beginning with the one-cylinder stationary engine and leading up to the more complicated mechanism of

the automobile. It was a tired and greasy class by five o'clock. One of the students explained the popularity of the class by remarking: "We got our knowledge of horses in the school of experience; we want our education in automobiles in a cheaper school."

A large number of special lectures were provided in the evenings to

illustrating his points by the description of actual happenings in Manitoba. Dr. Michael Clark, M.P., of Red Deer, addressed a large and enthusiastic audience on the subject of "Agriculture and Economic Problems." Mr. R. L. Richardson, Editor of the *Winnipeg Tribune*, gave an interesting talk on



RURAL MINISTERS AND TEACHERS STUDYING THE MECHANISM OF GAS ENGINES

which not only the students of the College, but also the public, were invited. Mr. J. W. Dafoe, Editor of the *Manitoba Free Press*, spoke ably on "Present-Day Problems." The Hon. Dr. Thornton, Minister of Education for the province of Manitoba, described the forward movement in education in Manitoba,

"Citizenship." Other lecturers were: President J. B. Reynolds, who spoke on "Rural Values", the Rev. Dr. R. C. Johnstone, Librarian, Winnipeg Public Library, and Professor V. W. Jackson, of the Manitoba Agricultural College, who gave an illustrated lecture on "Birds."



PREACHERS AT PLAY, UNDER THE DIRECTION OF MR. R. W. MURCHIE

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

ASSOCIATIONS AND SOCIETIES

THE WESTERN CANADA IRRIGATION ASSOCIATION

BY ROBERT J. C. STEAD, ACTING SECRETARY

THE eleventh annual convention of the above association was, this year, held at Maple Creek, Sask. This is the first time that the convention has been held in Saskatchewan, and it was particularly appropriate that the deliberations should be presided over by Hon. W. R. Motherwell, Minister of Agriculture for the province, who made a strong appeal for greater production.

Maple Creek is the centre of Saskatchewan's irrigation enterprises, which are on a much larger scale than most people, even residents of that province, appreciate. A large number of streams flow down from the Cypress Hills, and back in the '90's the ranchers began diverting the water from these streams for hay and pasture purposes. It is recorded that the first ditches at Maple Creek were dug in 1896, although the first irrigation license was not issued until 1900. About the same time irrigation began to be employed at Bear Creek and Piapot Creek. From these beginnings an irrigation district with 190 schemes has been developed. The irrigation is employed mainly for pasture and for growing crops of hay and other fodder. Irrigation and dry farming are practised side by side and the crop marketed at Maple Creek in 1916 had a valuation of \$2,500,000.

The programme included the names of Prof. J. Bracken, of the Field Husbandry Department, University of Saskatchewan; Don. H. Bark, Chief of Irrigation Investigation Division of the Canadian Pacific Railway; Prof. W. H. Fairfield, Superintendent, Dominion Experimental Station, Lethbridge; F. H. Auld, Deputy Minister of Agriculture for Saskatchewan; F. M. Logan, Assistant Dairy Commissioner, Regina; James Johnson of Nelson, B.C.; Prof. L. S. Klinck, Dean of the Faculty of Agriculture of the University of British Columbia; G. R. Marnoch, President of

the Lethbridge Board of Trade; A. S. Dawson, Chief Engineer of the Canadian Pacific Railway, Department of Natural Resources; Archibald Mitchell of the Mitchell Nursery Company; A. A. Dowell, Animal Husbandry Instructor of the University of Alberta; F. B. Linfield, Director Montana Agricultural Experiment Station at Bozeman, Montana, and others. The first three named—Messrs. Bracken, Bark and Fairfield,—devoted themselves entirely to a discussion of alfalfa raising, Mr. Bracken dealing with alfalfa under dry land conditions and Messrs. Bark and Fairfield discussing it under irrigation conditions. Alfalfa is essentially an irrigated crop, which is best illustrated by Prof. Fairfield's remark that the Lethbridge irrigation district is now the principal alfalfa centre of Canada, with about 15,000 acres devoted to this crop. It was grown originally for export, but has become the basis of an important live stock and dairy industry. The feasibility of increasing the fish supply of the country by employing irrigation reservoirs for that purpose was discussed in a very interesting paper by Prof. E. E. Prince, Dominion Fisheries Commissioner of Ottawa.

An invitation was received from the Nelson Board of Trade to make that city the next convention centre, and this invitation was supported by Mayor Annable of Nelson. As it is the practice of the association to meet year about on opposite sides of the Rockies, the invitation was accepted. The election of officers resulted as follows: Hon. President, the Hon. Minister of the Interior, Dr. Roche, Ottawa; First Hon. Vice-President, the Hon. Minister of Agriculture Duncan Marshall, Edmonton; Second Hon. Vice-President, the Hon. Minister of Agriculture, Mr. Motherwell, Regina; First Vice-President, Hon. Hewitt Bostock, Ducks, B.C.; Second Vice-President, G.

R. Marnoch, President of the Board of Trade, Lethbridge.

Executive Committee: R. G. Williamson, Maple Creek, Sask.; Jas. L. Brown, Kamloops, B.C.; Jas. Johnstone, Nelson,

B.C.; F. H. Peters, Calgary; A. S. Dawson, Calgary; W. E. Scott, Victoria, B.C.; F. H. Auld, Regina, Sask.; F. E. R. Wollaston, Vernon, B.C.; Robert J. C. Stead, of Calgary was elected acting-secretary.

THE THIRTEENTH ANNUAL MEETING OF THE CANADIAN SEED GROWERS' ASSOCIATION

BY L. H. NEWMAN, B.S.A., SECRETARY-TREASURER

THE thirteenth annual meeting of the Canadian Seed Growers' Association was held in the offices of the Dominion Seed Commissioner, Ottawa, on Tuesday, July 31st, and continued on Wednesday, August 1st, at the Central Experimental Farm. The reports of the directors and the secretary for the year ending March 31st, 1917, having been well considered, were adopted unanimously.

THE DIRECTORS' REPORT

The report of the directors, after referring to the disturbed condition of the universe and to the unfavourable results of crop production in 1916, which had brought a flood of enquiries and an extra demand for good seed, dealt with the prospects of increased settlement after the war, pointing out the accession of responsibility that would accrue to see that all arable land available in Canada be made the most of. The directors deplored the fact that vast areas in Western Canada were at present given over largely

to weeds.

In seeking a plan of action for the future the directors reviewed the conditions that existed as regards registered and improved seed in the period extending from 1910 to 1915. During that period it was found that there had been a steady and substantial increase in the acreage devoted to the production of registered seed. In 1910, 236 acres were devoted to the production of registered and improved seed, yielding 4,576 bushels of cleaned seed. In 1915, 3,533.4 acres were occupied in the production of this class of seed. This acreage produced 85,453 bushels of cleaned marketable seed. In 1910, 2,250 bushels of registered seed and 1,291 bushels of improved seed were offered for sale, while in 1915, 27,045 bushels of registered seed and 51,259 bushels of improved seed were offered.

The following table gives in detail the acreage and production during the years under consideration as well as those for 1916:

ACREAGE AND YIELDS OF REGISTERED AND IMPROVED SEED

	Acreage sown	Bushels produced	Reg. Seed offered for sale	Imp. Seed offered for sale	Total Seed offered for sale
1910	236	4,576	2,250	1,291	3,541
1911	785	17,211	10,000	6,531	16,531
1912	1,421	33,474	10,017	6,356	16,373
1913	2,149	67,771	23,139	42,869	66,008
1914	3,113	70,303	17,533	23,430	40,963
1915	3,533.4	85,453	27,045	51,259	78,304
1916	4,405.5	66,355	35,623	25,945	61,568

It was pointed out that, encouraging as the foregoing figures are, they do not adequately represent the ever-increasing extent of the work the Association is carrying on. Over fifteen hundred farmers are now engaged in an endeavour to maintain a high standard of excellence in their field crops through the use of selected seed and to get their neighbours to do the same. Prizes were offered for registered seed at the provincial exhibitions in Quebec, Ontario, Manitoba and Saskatchewan. Conferences in connection with the exhibitions were held at most places and valuable papers read.

THE SECRETARY'S REPORT

The secretary's report which not only covered the year ending March 31st, 1917,

but was brought up to the date of the meeting, July 31st, stated that 285 applications for membership had been received during the year as against 132 the previous year. It explained that the Seed Centre scheme was not meeting with quite the success that was anticipated in the beginning, although progress had been made. Farmers appeared to prefer to work independently. In some provinces, notably Alberta, the difficulty which had confronted the Provincial Department of Agriculture in inspecting the fields of individual growers who are located at distant points had resulted in special efforts being put forth to have these isolated growers encourage neighbours to join with them in forming seed centres where a considerable area could be devoted in a given district

to the production of high-class seed, thus justifying the sending of an expert to examine and report on the fields. The policy of leaving the field inspection work entirely to the provinces had worked out

fairly well.

THE YEAR'S INSPECTION WORK

Following is a summary of the work of inspection for the year 1916:

	Mar. Provs.	Que.	Ont.	Man.	Sask.	Alta. B.C.	All Provs.
Number of growers answering enquiry cards and stating that they wished to be visited	42	57	72	20	93	41	325
Number visited by inspector	51	28	91	16	89	16	291
Number hand-selected seed plots operated in 1916	89	25	54	15	11	42	236
Number growers making selections	32	19	41	9	50	12	163
Average size of hand-selected plots in case of cereals (acres)	.23	.45	.54	.36	.35	1.55	.58
Total areas devoted to hand-selected plots (acres)	16 03	11.27	29 05	5 42	39 06	65 07	165.90
Total areas devoted to multiplying fields (acres)	605	122	683 3	59 75	2010	535 75	4405.50
Total amount produced on multiplying fields (bus.)	15,850	4,040	9,405	6,255	19,689	11,111	66,350

The inspection of thrashed seed produced and offered for sale by members was performed by temporary inspectors employed directly by the Association. The inspectors with one or two exceptions were the same men as those engaged during the previous year.

The chief difficulty connected with the inspection of seed in sacks is that of expense. While it seems absolutely necessary to the success of the work that all registered seed should be examined and sealed in sacks by an expert, yet the expense of carrying this into effect appears high compared with the amount of seed actually inspected. Where seed centres exist this difficulty does not obtain. In some cases it has been possible to cut down expenses by having the seed inspected at its destination where it can be reached more conveniently. This practice is regarded as dangerous, although at present it seems the only solution to the difficulty.

The report proceeded to deal with the special work that is being done, stating that the number of men willing as members to take up the work was continually on the increase. It briefly reviewed the proceedings at the conference of growers held at Saskatoon, Sask., last fall and referred to the various meetings which had been attended.

POTATO CULTIVATION

In the discussion which followed the presentation of these reports the opinion was expressed that more systematic work should be done with potatoes. Dr. Zavitz referred to the excellent evidence now available to show the superiority of seed potatoes grown in the cool moist districts of New Ontario over potatoes grown further south. He believed that the Association, working in co-operation with the Provincial Department, had an excellent opportunity of creating a source of supply

of high-class seed potatoes in the Northern District mentioned. The secretary pointed out that action toward this end had already been taken and he confidently expected to see the work advance rapidly in the future, especially since the Provincial Department has now arranged to promote the work more aggressively.

In view of the information now available re the behaviour of potatoes, the Association agreed that the best method for the average farmer to follow in the production of potatoes, either for seed purposes or for food, is to procure the very best stock of the best variety available in Northern Ontario and to adopt the system of continuous selection of superior hills as required by the regulations followed by members of the Association. The evidence available up to the present demonstrates without question the value of this system. It is expected, however, that in many cases farmers can to advantage bring in a fresh supply of northern grown seed every few years. This would depend very largely upon the location of the farmer and the attention paid to the choice of seed.

SMUT IN BARLEY

Mr. Nunnick, of the Conservation Commission, referred to the prevalence of loose smut in barley this year. In Canada this disease has not heretofore attracted any considerable attention, as a result of which it has not been the practice of farmers to treat their seed barley for smut. Dr. Zavitz and others reported that the formalin treatment for oats has been quite ineffective in the case of barley smut. The best method of handling the latter disease was to treat with hot water, submerging the barley for five minutes in water held at a temperature of 125° Fahrenheit.

Mr. Moe of the Experimental Farm reported the prevalence of the disease known as Helminthporium which attacks the leaves of barley, producing an effect

very similar to that caused by ordinary rust. For this disease no effective treatment has yet been discovered.

In the commercial handling of seed it was recommended that purchasers be urged to treat their seed in all cases. The treatment of seed prior to selling is not practicable, since the effectiveness of the treatment diminishes rather quickly where seed is not sown at once. The use of new clean sacks for seed grain was also highly recommended.

Systems of cultivation to prevent the spread of certain weeds were discussed at some length, it being pointed out that most weeds could be overcome quite easily by the adoption of the proper methods of rotation and thorough cultivation.

AT THE CENTRAL EXPERIMENTAL FARM

At the Experimental Farm a careful examination was made of the various crops under test, a special study being made of the breeding work. Some very promising crosses made by Dr. Saunders and his assistants created a great deal of interest. A feature of this work which proved of special interest was the extent to which certain varieties were producing variations. The occurrence of these aberrant types goes to prove the value of the system of continuous selection and roguing adopted by the Association.

OFFICERS AND DIRECTORS

The following officers and directors were elected, ten of the directors being chosen

by the association and one by each of the nine provinces:

President, Dr. James W. Robertson, C.M.G., LL.D., Ottawa.

Vice-Presidents, Prof. C. A. Zavitz, Guelph; Prof. M. Cumming, Truro, N.S.; Prof. James Murray, Macdonald College, Que.

Secretary and treasurer, L. H. Newman, B.S.A., Ottawa.

Executive Council, Dr. James W. Robertson, L. H. Newman, Prof. C. A. Zavitz, Prof. T. J. Harrison, Agricultural College, Winnipeg; Prof. James Murray; R. S. Duncan, Department of Agriculture, Toronto; E. N. Savoie, Department of Agriculture, Quebec, Que.

Directors, G. H. Hadwin, Duncan, B.C.; Prof. John Bracken, Agricultural College, Saskatoon, Sask.; R. S. Duncan, Department of Agriculture, Toronto, Ont.; M. P. Tullis, Department of Agriculture, Saskatchewan; H. A. Craig, Deputy Minister of Agriculture, Edmonton, Alta.; Prof. M. Cumming, Agricultural College, Truro, N.S.; Geo. Dow, Gilbert Plains, Man.; Prof. T. J. Harrison, Agricultural College, Winnipeg; Dr. R. B. Hagerman, East Florenceville, N.B.; E. A. Howes, Edmonton; Prof. James Murray, Macdonald College, Que.; Prof. L. S. Klinck, Vancouver, B.C.; W. L. MacFarlane, Fox Harbor, N.S.; William H. McGregor, Miscouche, P.E.I.; William Palmer, Scotch Lake, N.B.; F. N. Savoie, Department of Agriculture, Quebec, Que.; W. W. Thompson, Department of Agriculture, Regina, Sask.; Dr. C. A. Zavitz, Guelph, Ont.

DEMONSTRATION IN CANNING AND DRYING FRUITS AND VEGETABLES

The Ottawa Horticultural Society in co-operation with the Women's Auxiliary of the Ontario Resources Committee, on August 15th, 16th and 17th, held a demonstration in Ottawa in the canning and drying of fruits and vegetables. The demonstration was in charge of Mr. F. E. Buck, President of the Ottawa Horticultural Society. The opening session of the three-day demonstration was opened by the Dominion Food Controller, Hon. W. J. Hanna, who expressed the hope that in a very short time such meetings would be under way in all parts of the Dominion.

The demonstrations covered the drying and canning of such crops as beans, carrots, beets, tomatoes, cauliflower, corn and various kinds of fruit. One session was devoted to a discussion on the storing of vegetables in cellars and pits. The demonstration was given by Miss Laura Kirby, of the Central Experimental Farm staff. Mrs. J. Muldrew, formerly Superintendent of the Women's Institutes in Alberta and now a member of the staff of the Food Controller, and other officials made strong appeals for economy in the use of foods.

THE BRITISH EMPIRE AGRICULTURAL RELIEF OF THE ALLIES FUND

Recovery after the war is a matter that is seriously engaging widespread attention, especially as regards the countries that have been devastated by German ruthlessness. In Belgium, in Northern France, in Serbia, in sections of Russia and in a

large part of Roumania, the country has been laid waste and farmers have lost their all. To aid these people to restoration an organization has been formed with headquarters in England and with branches in different parts of the Empire, under the

title of The British Empire Agricultural Relief of the Allies Fund. The object is to endeavour to get the agricultural communities in the countries not immediately in the whirl of belligerency to assist those that are. For this purpose a strong branch has been formed in Canada with His Excellency the Governor-General as patron, Rt. Hon. Sir Robert Borden and Rt. Hon. Sir Wilfrid Laurier, as honorary presidents, Hon. Martin Burrell, Hon. Sydney Fisher, Sir Henry Drayton, Mr. C. A. Magrath and the chiefs of the various branches of the Dominion Department of Agriculture as members of the executive committee, and Dr. Jas. W. Robertson as chairman, Mr. A. G. Parker, Hon. Treasurer, and Messrs. J. B. Spencer and C. E. Mortureux, honorary secretaries. Provincial com-

mittees have also been organized with the several lieutenant-governors as patrons and the Ministers of Agriculture as honorary presidents.

At a meeting of the central executive, held at the offices, Bank Street Chambers, Ottawa, on August 15th, a committee consisting of the chairman and Messrs. J. A. Ruddick, Dairy Commissioner, and C. E. Mortureux, official translator, was appointed to decide upon the best method of reaching the dairy farmers of the country. It was announced that an appeal to patrons of cheese factories and creameries had been prepared. Mr. Mortureux undertook to address the Catholic clergy of the province of Quebec in the interests of the movement.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF BOTANY

The Black or Stem Rust of Wheat; a popular account of the nature, cause and prevention of grain rust; Bulletin No. 33, second series. The object of this 16-page bulletin is well expressed in the first few lines of the introduction. It has been prepared, partly to amplify the illustrated coloured poster on the same subject recently issued by the Department, and partly to meet the many inquiries received by the Division, relating to the nature and cause of grain rust, about which there exist among farmers and others not always correct theories.

THE DAIRY AND COLD STORAGE BRANCH

Buttermaking on the Farm, by Geo. H. Barr, Chief of the Dairy Division; Bulletin No. 53, Dairy and Cold Storage Commissioner's Series, with an introduction by Mr. J. A. Ruddick, Dairy and Cold Storage Commissioner. This bulletin of 16 pages is a revision of Bulletin No. 17, which is practically out of print, with some additions. It is a veritable text book on butter-making, giving advice in plain terms on every item of the process with illustrations of utensils and plans of dairies.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

NEW BRUNSWICK

The Annual Report of the Director of the Elementary Agricultural Education Division

of the Department of Agriculture of New Brunswick for the Year Ending October 31st, 1916, makes a pamphlet of 26 pages. It contains complete accounts of the operations of the year and shows that considerable progress has been made in all departments, the number of pupils receiving instruction in Nature Study and Elementary Agriculture with school gardening having increased by over 1,000 compared with previous years.

ONTARIO

The Preservation of Food—Home Canning, compiled by Miss Ethel M. Chapman; Bulletin No. 252, Women's Institute series. In this 32-page bulletin, Miss Chapman not only tells about canning and preserving all kinds of fruit and vegetables and several kinds of meats, but she treats of the preservation of eggs, the drying of fruit and the curing of pork and beef. A chapter on "Storing Vegetables for Winter Use," by Mr. S. E. Johnston, is added.

Ontario Agricultural College and Experimental Farm, 1916. The forty-second annual report, a blue book of 72 pages, gives interesting accounts of the activities of last year, of the research that has been carried on and of the experiments that were in progress or completed. The report also contains lists of graduates and students. Among other statements is that 444 students had enlisted up to the end of the year, of whom 38 had been killed, or had died of wounds.

Pruning, by F. M. Clement, B.S.A., and F. S. Reeves, B.S.A. We have here a most instructive bulletin, numbered 248 of the Fruit Branch of the Provincial Department

of Agriculture, containing 36 pages and including 78 well-defined illustrations. It gives advice and counsel relative to the pruning of practically every fruit tree known to the province, large or small.

The Pear in Ontario, by F. M. Clement, B.S.A., and O. J. Robb, B.S.A. With numerous illustrations, this bulletin, which is No. 249 of the Fruit Branch of the Provincial Department of Agriculture, deals with the cultivation of the pear from inception to maturity and on to the marketing. It advises as to the varieties best suited to Ontario, tells of the profit that can be made and supplies information regarding the combating of insect and

disease.

Insects Affecting Vegetables, by C. J. S. Bethune, Professor of Entomology; Bulletin No. 251, Ontario Agricultural College. In this 32-page bulletin full descriptions, with illustrations, are given of the many kinds of insect pests to which vegetables are subject. The best treatment for their suppression is also prescribed in detail.

Ontario Veterinary College Calendar, 1917-18. Term commences October 1st, 1917, and closes May 1st, 1918. Full particulars of the studies, the fees and the honours to be gained are given in the calendar.

COOKING AND CANNING

A number of bulletins on Cooking and Canning for free circulation have been issued by the colleges and Departments of Agriculture. Among them might be mentioned:

Canada—Can for Victory; published by the Food Controller.

Ontario—Home Canning of Fruits and Vegetables, by E. L. Davies, Demonstrator in Bacteriology, Ontario Agricultural College.

Macdonald College, Quebec—Home Canning of Fruits and Vegetables, by Miss K. A. Fisher, B.A., School of Household Science.

School Fair Cookery, Bread and Cake, prepared by School of Household Science.

Saskatchewan—The Value of the Kitchen Garden, by Miss Abbie DeLury, Director of Homemakers' Clubs.

Preservation of Food, by Miss Abbie DeLury.

New Brunswick—Modern Methods of Canning, by Miss Ada B. Saunders, Household Science Demonstrator.

Prince Edward Island—The Home Canning of Fruits and Vegetables, by Miss Hazel L. Sterns, Supervisor of Women's Institutes.

Nova Scotia—The Cooking and Canning of Vegetables, by Miss Jennie A. Fraser, Superintendent of Women's Institutes, and P. J. Shaw, Professor of Horticulture.

NOTES

Mr. William Dawson, B.S.A., who, since the inception of THE AGRICULTURAL GAZETTE, had been the Assistant Editor, has resigned to accept a position on the staff of the Moving Picture Bureau of the Ontario Government.

Mr. J. R. Spry, B.S.A., who had been in charge of the drainage work of the province, has been appointed Director of Industrial Farms for Ontario, in succession to Mr. S. E. Todd, who is now Assistant to the Food Controller of Canada.

On June 30th, 1917, according to the Census and Statistics Bureau, compared with the numbers on the same date in 1916, horses had increased in Canada by 44,629, milch cows by 34,364, other cattle by 11,494 and sheep by 44,616. Swine had decreased by 301,146. Since 1912 horses have increased by 342,897 and milch cows by 38,221. Other cattle have decreased by 502,360, sheep by 72,664 and swine by 963,784.

On account of the rapid development of Agricultural Extension work and for the convenience of those who desire to transact business with the Extension Service officials, the Extension office has been moved from the Manitoba Agricultural College to the new Parliament Buildings in Winnipeg. The work will continue to be under the direction of Prof. S. T. Newton, the Superintendent of the Service.

Although the quantity of butter exported from Australia for the year 1916-17 has been exceeded on several occasions, notably in 1911, the cash returns received show that the past season was the most profitable in the record of the butter industry. At the end of April, 1917, the value of the butter sent aboard was \$25,025,321, as compared with \$22,538,619 in 1911. In spite of the scarcity in freight there were 69,053,260 pounds of butter exported in 1916-17 at an average of 36¼c. per pound.

INDEX TO PERIODICAL LITERATURE

- The Canadian Entomologist*, London, Ont., August, 1917.
 Popular and Practical Entomology—The Strawberry Root Weevil in British Columbia, R. C. Treherne, Entomological Branch, Department of Agriculture, Ottawa, page 257.
- The Canadian Countryman*, Toronto, Ont., July 14th, 1917.
 Skim-Milk as Feed for Calves, Pigs and Poultry, page 896.
 July 21—Sheep Parasites and How to Control Them, E. A. A. Grange, Principal, Ontario Veterinary College, page 924.
 Aug. 11—Buttermilk Low in Protein—Good Food for Hogs and Poultry, H. H. Dean, page 1009.
 Aug. 25—The Show a Sales Ring for Cattle Breeders, E. S. Archibald, page 1064. Fitting and Preparing Sheep for the Show Ring, T. Reg. Arkell, page 1069.
 Sept. 1—Powdered Milk—New Addition to Canadian Dairy Industry. Canadian Manufacture Chiefly of Skim Milk Powder—Will not Replace Fresh Whole Milk—H. H. Dean, page 1100.
- Rural Canada for Women*, Toronto, Ont., Sept., 1917.
 Your Ottawa Library, page 19.
- Canadian Forestry Journal*, Woodstock, Ont., Aug., 1917.
 What Birds are Worth to Forests. W. C. J. Hall, Quebec, page 1252. Conscripting Forests for Peace or War. Robson Black, Secretary, Canadian Forestry Association, page 1257.
- The Western Home Monthly*, Winnipeg, Man., Aug., 1917.
 The Young Men and His Problem, Prof. W. F. Osborne, University of Manitoba, page 25.
- The Saturday Press and Prairie Farm*, Saskatoon, Aug. 25, 1917.
 The Free-Martin—A Phenomenon which has often Puzzled Breeders, Professor L. J. Cole of the University of Wisconsin, page 7.
- The Grain Growers' Guide*, Winnipeg, Man., July 18th, 1917.
 At Indian Head Experimental Farm, page 7.
 Aug. 1—Seed Selection for Next Year, Seager Wheeler, page 1243.
- Farm and Dairy and Rural Home*, Toronto, Ont., August 2, 1917.
 What Feeds Shall I Buy for Winter Use? E. S. Archibald, Dominion General Husbandman, page 843.
- The North-West Farmer*, Winnipeg, Man., July 5, 1917.
 Manitoba's Provincial Ploughing Competition, page 751.
 Co-operative Marketing of Live Stock W. W. Thomson, Director Co-operative Organization, Department of Agriculture, Regina, Sask., page 755.
- The Maritime Farmer and Co-operative Dairyman*, Sussex, N.B., July 10, 1917.
 Sweet Clover—The Truth, M. O. Malte, Ph.D., page 556.
 The Feeding of Swine, G. G. Ruthwell, B.S.A., Assistant Animal Husbandman, page 557.
 July 24—Progressive Agricultural Legislation in New Brunswick—Enacted at the 1917 session, page 584.
 The Last Word in Canning—How the Housewife may do her Share in the Conservation of Food, page 589.
- Farmer's Advocate and Home Journal*, Winnipeg, Man., July 25, 1917.
 Winter Rye—Its Place and Culture, W. T. G. Wiener, B.S.A., page 1067.
- Canadian Poultry Review*, Toronto, Ont., August, 1917.
 "Catching Them Young"—What is being done to Teach the Young Idea Poultry Raising, page 325.
- The Farmer's Magazine*, Toronto, Ont., August, 1917.
 O. A. C. No. 104 Winter Wheat, by Editor, page 7.
- The Canadian Thresherman and Farmer*, Winnipeg, Man., July, 1917.
 Conserving the Surplus, page 5.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, Institute Commissioner, Department of Agriculture, Ottawa.

Unless application through the Canadian Commissioner is preferred, the original Institute Bulletins may be obtained direct from the General Secretary of the International Institute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

	Per annum.
International Review of Agricultural Economics.....	18 francs
International Review of the Science and Practice of Agriculture.....	18 "
International Crop Report and Agricultural Statistics.....	6 "
The Three Bulletins together.....	36 "

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

1—**International Yearbook of Agricultural Legislation.**—*International Institute of Agriculture*, Rome, 1916.

The International Institute of Agriculture has published the fifth volume of the *Yearbook of Agricultural Legislation*, which contains the laws relating to agriculture published in the different countries of the world. The *Yearbook* is divided into: Legislation regarding statistics—Commercial legislation—Financial and Customs legislation—Laws concerning animal products—Laws regarding agricultural organization—Laws concerning diseases and animal pests of plants—Legislation for cooperation, insurance and credit—Laws concerning real-estate—Legislation regarding relations between capital and labour in agriculture—Legislation concerning rural hygiene and rural police.

Some brief indications of the most important laws published in the technical parts of the *Yearbook* may be given.

Chapter I of Part IV relates to laws for crops during the war and gives the whole text of the decrees of the German Empire of March 31, 1915, and September 9, 1915, with the object of providing for sowing

down crops during the war. The Austrian Empire published, on March 3, 1915, a decree to provide for the reclaiming of uncultivated land during the war, and on May 6, 1915, another decree providing for the utilisation of all the ground which is suitable for use as pasture.—France, by a decree of September 7, 1915, proposed to develop agricultural production during the war, by supporting the use of agricultural machinery by means of grants to aid purchase.—Greece, by a law dated October 28, 1915, has decided the rules to be followed for agricultural progress, in spite of the special conditions owing to present circumstances. Italy, by a decree of June 3, 1915, has taken steps to assure the quick and steady execution of work related to the crops, and by another decree of June 6, 1915, has authorized the Minister of Agriculture to buy agricultural motors and machinery and to give premiums to those associations which, by means of the implements they possess, undertake the methodical execution of agricultural work of general utility.

Chapter II of Part IV contains the measures taken to provide for the normal development of crops in general. It contains a law of the Argentine Republic of

June 8, 1915, which obliges the Executive Committee of the Corn Exchange to buy seed for distribution to agriculturists unable to do so, and two laws of Manitoba (Canada) of March 10, 1915, with the object of providing seed for such agriculturists as are unable to obtain it directly.—In the chapter on forests, the *Yearbook* publishes the laws of the Grand-Duchy of Baden, China, New Hampshire (U.S.A.), Regency of Tunis, Greece and Uruguay, which deal with the administration of the forests, reafforestation, forests police, etc. The Chinese law of November 3, 1914, which organises forest administration throughout China and gives measures for reafforestation, is of special interest.

Part V of the *Yearbook*, devoted to animal production and products, shows the legislative activities of the various countries to assist animal production and products. This activity is shown under: Measures for developing and improving breeding.—Diseases of animals.—Hunting and fisheries.—Beekeeping and silkworm raising.—The English law of July 29, 1915, which has for object the maintenance of a certain number of livestock for the duration of the war, and for 12 months after the cessation of hostilities, deserves special attention. To attain this object, the law, which applies to Ireland, Scotland, Wales as well as England, authorizes the Departments of Agriculture to prohibit or limit the slaughter of livestock, to prohibit or limit the sale of the meat of animals under a certain age, to give powers to local authorities to assure the administration of the law, etc. The Spanish law of December 18, 1914, and the regulation of June 4, 1915, regarding preventive measures and the control of diseases of animals are also important. The law and the regulation are divided into two categories: the first regulates the internal organisation of the Department for the control of diseases of animals and states the guiding principles to be followed for control; the second includes measures regulating the import and export of animals.

The measures taken in the various countries for regulating agricultural organisation and education are grouped together in Part VI of the *Yearbook*. The first class includes an ample set of legislative measures. It includes measures taken in order: to create state organisations for the guidance of agricultural production, or to modify existing institutions for that purpose; to found purely advisory bodies; to found public organs of local character in order to direct the activity of agriculturists according to modern technical principles from a practical point of view. A group of Brazilian decrees is also noted, of which, one of January 13, 1915, defines the functions of the Secretary of State for Agriculture, another of January 27, 1915, creates the Department of Animal Husbandry

and regulates its activities, while a third of April 6, 1915, regulates the functions of the Department of practical agriculture and a fourth, of Jan. 27, 1915, controls the working of the federated zootechnical Stations.

Part VII contains the regulations issued in 1915 for the control of plant diseases, weeds, and animals injurious to plantations to control pests that have already appeared, and to help agriculturists having suffered from the pests. Many of these regulations are in relation to the control and destruction of locusts; the most important laws are those of: Columbian Republic, November 15, 1915.—Costa Rica, June 3, 1915.—Philippine Islands, February 5, 1915.—Madagascar, October 5, 1915.—Guatemala June 5, 1915. Among other decrees given in this part of the *Yearbook* may be mentioned the French decree of February 5, 1916, extending the duties of the Department of Phytopathological Inspection, created by decree of May 1, 1911, modified under date of January 16, 1913, and which devotes this Department, at first limited to horticulture, to agricultural production in general.—A law of British Columbia (Canada), of March 6, 1915, contains regulations for the control of weeds, and a decree of Uruguay of January 16, 1915, regulates the carriage of plants in order to prevent the spread of plant diseases.

2—Agriculture in Guatemala—LEMUS MANUEL, in *Centro America, Organo de Publicidad de la Oficina Internacional Centro-Americana*, Vol. VIII, No. 3, pp. 322-340. Guatemala, July-September, 1916. (5 pp. in Institute Bulletin).

3—The First Agricultural Demonstration Trains in Russia.—BENINE V., in *Agriculture and Forestry*, Vol. CCLI, Year LXXVI, May, June and August, pp. 10-30; 161-179; 506-521. Petrograd, 1916.

In Russia, the first agricultural demonstration train was established on the Vladikavkaz railway, which belongs to a private company. The idea of such a movable agricultural museum and lecture room was suggested to the Railway Company in 1908 by the Don-Kouban-Tersk Agricultural Society. The Company, which had previously tried to encourage the development of some branch of agriculture among the numerous railway men, wrote in 1912 in a report of the general Direction that 40 percent. of the total goods carried by the railway system consisted of agricultural products, principally cereals and that it was to the interest of the railway company to cooperate in the agricultural development of the region; it indicated, as a means to be used, the creation of experiment plots at the railway stations, which should act, according to the needs of the locality as active centres of agricultural propaganda. Ten of these

experimental fields were to be founded, and in addition, a silo was to be built at Beslau station in the maize region. This proposal was received favourably by the general Direction, and not long after, the Agricultural Department nominated agricultural experts to organise the work of the first three experimental fields, which were to be established the same year.

In addition the Railway Company exchanged ideas with the local Agricultural Societies and the Agricultural Department with good results, so that on September 26, 1913, the first agricultural train, made up of 11 carriages, could commence its itinerary on the Vladikavkaz Railway; it visited 48 stations in 48 days and about 60,000 people came to see it.

On account of the satisfactory result of this first trial, another train was organized in the spring of 1914 with the chief aim of selling the seeds of forage and kitchen-garden plants, insecticides, books on agriculture, etc.

The train was also utilized during the autumn. It then comprised 14 carriages: 1 for teaching material regarding field cultivation—1 for economic zoology—1 for fruit trees—1 for beekeeping—1 for poultry keeping—3 as platforms for agricultural machinery and implements—1 for the sale of books on agriculture—1 (second class) for the agricultural staff—1 (first class) for dining room—1 (fourth class) for the assistants—1 as platform for exhibiting diagrams, etc., and for lectures—1 cold storage car. The train was in commission for 66 days (Sept. 16—November 21); it stopped at 58 stations, and was visited by 41,586 persons, including: 12,601 agriculturists—18,506 women—20,464 scholars of both sexes accompanied by their teachers.

In the spring of 1916, the train was organized for the sale of seed, insecticides, etc., selling a total value of \$105,000. The sale of seed gave such encouraging results that the Railway Company has decided to rent the necessary ground to produce the seeds of kitchen-garden plants, while the Agricultural Department will provide the seed. In consequence of such results, the Department has awarded a grant of \$3,200 for the purchase of teaching material, and the Railway Company has commenced building a lecture car 66 ft. long, with a cinematograph, projection lantern, and to contain 200 persons. At present, the work of the train is carried on under a director who has three assistants and one agent for the sale of seed, etc., and who gets in touch with the local agricultural organisations to settle the propaganda work to be carried out in each district. The Author, who is now the director of the train, concludes his report thus:

1) Agricultural trains may become a powerful means for agricultural propa-

ganda work, and contribute to the development of all kinds of farms, particularly small farms.

2) The activity of this agricultural train ought to correspond to the real needs of local agriculture and should as far as possible be always based on the results of local agricultural experiment stations and local farms showing the most progress.

3) The work of the train should be intimately connected with that of the local agricultural societies and with that of the States.

4) Given that the state of agriculture has a great influence on the goods-traffic, and consequently on the Railway returns, the Railway Company should regularly provide the expenses for the agricultural trains as a means favouring a greater use of the railways crossing the agricultural regions of Russia.

5) Given that each railway traverses several regions and provinces, each having its own agricultural society, it is necessary, when establishing an agricultural train, to establish also an agricultural organisation capable of carrying out the work in all the regions traversed by the railway, and in cooperation with the local societies.

6) Given the national importance of the agricultural trains, it is to be desired that, if they are to be instituted on all the railways, a special law should be passed concerning them and treating them as an institution.

In 1914, following the example of the Vladikavkaz Railway, the Moscow-Kazan Railway has instituted a special agricultural train, and the South East Railway organized in 1916 its first agricultural train for the sale of seed, etc.

4—Volunteer Co-operators with the United States Department of Agriculture.—*United States Department of Agriculture, Weekly News Letter*, Vol. III, No. 46, Washington, D.C., June 21, 1916.

Nearly 770,000 persons, largely successful farmers, are now aiding the department by furnishing information, demonstrating the local usefulness of new methods, testing out theories, experimenting and reporting on conditions in their districts—by helping in short in almost every conceivable way to increase the knowledge of the department and to place that knowledge at the service of the people. The army of volunteers receives no pay from the Government. It is estimated that at least one farm out of every twenty is working in some way with the department.

The great majority of the co-operators are men who farm for a living. A wide variety of other occupations, however, is represented. For instance, fifteen thousand railroad station agents have been instructed by railroad officials to furnish the Office of Markets and Rural Organ-

ization with postcard reports of shipments of perishable crops, which are used in the market news service of the office; four hundred cold-storage plants report monthly on their holdings of apples; millers, grain dealers, chambers of commerce, etc., furnish data in connection with the work of grain standardization. These are only a few instances out of many.

The demonstration work of thousands of farmers, members of farm bureaus, county associations and community clubs is of the

utmost importance in the spread of sound agriculture. An instance may be mentioned, of a thousand farmers now taking part in demonstrations concerned with cultural methods for sugar beets. The farmers also actively assist the department in the conduct of experiments. Eleven thousand are growing the plants which the department introduces from foreign countries. Seed corn is being tested by a large number, and many other experiments are being carried out.

CROPS AND CULTIVATION

5—Weather Forecasting and Mountain Stations.—FERGUSSON S. P., in *The University of Nevada Agricultural Experiment Station Reno, Bulletin No. 83*, pp. 4-30. Carson City, Nevada, 1915.

The writer discusses the advantages to be obtained, in regard to weather forecasting, from the comparative statistics furnished by stations situated at the foot and summits of mountains. Observations have been made at Mt. Rose (10,600 ft.) and at Fallon, situated 60 miles to the East of Mt. Rose in the Carson Luik Valley, at an altitude of 3,960 ft. The most important results are appended. They are also confirmed by those from other mountain stations.

1) On Mt. Rose, during the period 1911-1914, 32 cases of abnormal and rapid fall of temperature were observed; these were accompanied at the Fallon Station by: a) in 15 cases, an absolute fall simultaneous with the above; b) in 7 cases, a slight rise of temperature; c) in 10 cases, a corresponding fall in temperature, occurring not simultaneously but in the course of the following 48 hours.

The most conclusive results were obtained at Mt. Royal (800 ft.), Canada, where the thermometer was used in conjunction with that of the station in the plain, viz.: the observatory of the University of McGill.

a) When the temperature at the upper station remains invariably higher than that at the lower station, the weather tends to remain stable, or to become warm;

b) On the other hand, the occurrence of lower temperatures on the mountain tops is to be regarded as an indication of the early arrival of a cold wave in the plain (cf. case c, Mt. Rose).

2) When the falls in temperature at foot and summit are simultaneous a cyclone or an anticyclone may be expected over the region concerned.

3) The movements of the atmosphere in general are strongly influenced by the

features of the mountain relief between the highest and most isolated peaks. The data collected on the mountain top by no means correspond with those obtained at the same average level over the plain by means of kites and observation balloons.

4) The comparison of data obtained at the foot and summit of mountains has clearly demonstrated the value of this type of research in establishing the effect of topography on the behaviour of the weather. The local study of optical atmospheric phenomena and a knowledge of local topographical relationships as a function of the distribution of meteorological factors are of considerable value as a means of increasing the utility of daily weather bulletins and maps.

8—The Washing out of the Nitrates from Arable Soil at Rothamsted.—RUSSELL, E. J., and APPELYARD, A., in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 1, pp. 22-27, London, April, 1916. (2 pp. in Institute Bulletin).

The winter 1915-16 was much wetter than usual at Rothamsted, especially during December and February.

It is well known that, in washing through the soil, water carries with it a considerable amount of soluble material and produces two effects: (1) deflocculation of the clay; (2) washing out of the nitrates.

At Rothamsted the loss of nitrates was least on heavy land, greater on good land and on light land, and greatest on land that had been well manured the previous year and fallowed. The author gives a detailed account of the amount of rainfall and the loss of nitrates in the various plots.

The remedies suggested are: (1) the clay has to be flocculated once more, by applying to the soil, chalk, limestone, lime or soot. (2) the loss of nitrate has to be made good, by a dressing of quick acting nitrogenous manure. Soot serves for either purpose, a fact that the practical man has long since realized.

14—The Utilisation of Sewage-water in Italy.—ATTA, A., in *L'Italia agricola*, Year 53, No. 11, pp. 499-502. Piacenza, November, 15, 1915. (2 pp. in Institute Bulletin).

18—Seeds and Plants Introduced into the United States by the Bureau of Plant Industry of the Department of Agriculture during the Second Half of 1913.—I. U. S. Department of Agriculture, Bureau of Plant Industry, *Inventory of Seeds and Plants Imported by the Office of Foreign Seed and Plant Introduction During the Period from July 1 to September 30, 1913*, No. 36, 74 pages + 6 Plates Washington, December 23, 1915.—II. *Idem*. *Inventory No. 37* (Period from October 1 to December 31, 1913) 95 pp. 6 plates, Washington. March 25, 1916. (8 pp. in Institute Bulletin).

19—The Determination of Dry Matter in Beets and Other Roots.—CHRISTENSEN, R. K., Communication transmitted to the International Institute of Agriculture by its Danish correspondent, Baron Rosenkrantz. (3 pp. in Institute Bulletin).

In Denmark there are made each year a large number of determinations of the dry matter in different roots, by different methods of research, such as those made in agricultural laboratories which investigate cattle feeds—experiments undertaken by the state for the cultivation of plants—local field experiments undertaken by agricultural societies. Besides determinations of dry matter are made in the work of improving root seed, and of controlling the feeding of cattle. Finally, besides the State laboratories there is a considerable number of private ones. The methods employed are described in detail in the Institute Bulletin.

21—A Bacterial Test for Plant Food Accessories (Auximones).—BOTTOMLEY, W. B., in *Proceedings of the Royal Society (Biological Sciences)* Series B, Vol. 89, No. B 610. London, August 2, 1915.

The nutrition of a plant depends, not only on the supply of mineral food substances, but also upon the presence of certain accessory food substances, or auximones (=promoting growth), very small amounts of which are sufficient to satisfy the needs of the plant. Hitherto the only means of demonstrating the presence of auximones has been their action on the higher plants. Experiments showed that the auximones in bacterised peat produced an increase in soil nitrification. This suggested that liquid cultures of the nitrifying organisms might provide a test for plant auximones.

23—The Relation of Soil Moisture to Transpiration and Photosynthesis in Maize.—YUNCKER, T. G., in *Plant*

World, Vol. 20, No. 6, pp. 151-161. Baltimore, Md., June, 1916.

Experiments to determine the relation between the amount of transpiration and of photosynthesis in corn plants and the degree of soil moisture in which they were grown. The soil moisture was kept at three degrees, viz., 25, 45 and 65 per cent of total saturation.

24—Germination Tests of the Seeds of Garden Cress (*Lepidium sativum*) under very varied Conditions.—LESAGE PIERRE, in *Comptes Rendus des Séances de l'Académie des Sciences*, 1916, Second Half-year, Vol. 163, No. 18, pp. 486-489. Paris, October, 30, 1916.

26—Studies on the Correlation of Characters in the Oat Plant, in U.S.A.—LOVE, H. H., and LEIGHTY, C. E., in *Cornell University Agricultural Experiment Station, Memoir No. 3*, pp. 1-70. Ithaca, N.Y., 1916. (7 pp. in Institute Bulletin).

28—Correlation between the External and Internal Morphology and the Length of the Vegetative Period of some Varieties of *Trifolium pratense*; Research-work in Russia.—JOLTKEVITCH, V., in *Review of Experimental Agricultural Science dedicated to the memory of P. S. KOSSOVITCH*. Vol. XVII, Part 3, pp. 239-248. Petrograd, 1916. (4 pp. in Institute Bulletin).

Researches carried out part at a farm in the province of Orel, part at the agricultural laboratory of the University of Kiev. The observations were made in 1912 and 1914.

29—Experimental Work in Egypt on Various Cereals.—I. DUDGEON, G. C., and BOLLAND, G., *Work on Egyptian Wheats, in Egyptian Ministry of Agriculture, Technical and Scientific Bulletin*, No. 7, 9 pp. Cairo, 1916.—II. HUGHES, F., *Tests of Flour made from Egyptian Wheats, Idem.*, No. 10, 12, pp. illus.—III. BOLLAND, B. G. C., *Work on Great Millet (Sorghum vulgare) and Bersim (Trifolium alexandrinum)* (1), *Idem.*, No. 8, 8 pp.—IV. DUDGEON, G. C., and BOLLAND, B. G. C., *Work on Egyptian Maize, Idem.*, No. IX, 8 pp.

32—Commercial Varieties of Alfalfa in the United States.—OAKLEY, R. A., and WESTOVER, H. L., in *United States Department of Agriculture, Farmers' Bulletin* 757, 24 pp. Washington, October, 1916.

There are recognized in the United States nine distinct kinds of commercial alfalfa, differing in their adaptation to climatic conditions: the common alfalfa group, the Turkestan group, Grimm, Baltic, Canadian variegated, sand lucerne, Peruvian, Arabian and the yellow-flowered group.

The bulletin deals with each variety in

detail. Among the conclusions are the following: It is highly advisable that the farmer should learn to distinguish good from poor seed. Plump seed of an olive-green colour almost invariably germinates well, while shrivelled or brown seed generally germinates poorly. The presence of any appreciable quantity of weed seeds or other impurities indicates a poor quality of seed. Owing to the fact that alfalfa does not produce seed satisfactorily in the United States there is little use trying to grow it for seed in the Eastern States. Breeding work with alfalfa offers great possibilities, but the time and expense involved are so great that a farmer cannot afford to undertake it.

39—Peanut Oil.—THOMPSON, H. C., and BAILEY, H. S., in *United States Department of Agriculture, Farmers' Bulletin* 751, 16 pp. Washington, August 1916. (2 pages in Institute Bulletin).

The principal by-product of peanut-oil manufacture is the meal, which is a very valuable feed. Peanut meal has about the same fertilizer value as cottonseed meal, but its greatest value is for live stock feeding. The hulls may also be classed as a by-product. They can be ground with the meal to give bulk, but they do not add to the food value. They can also be used as fuel in the boilers of the oil mill, or as bedding for live stock.

40—The Acclimatization of a Rapid Growing tannin Plant (*Rumex Hymenosepalum*) in France.—PIEDALLU, A., in *Comptes Rendus de l'Académie des Sciences*, 1916, Vol. 163, No. 20, pp. 575-576. Paris, November, 1916.

41—The Effect of Continued Capillary Watering.—DANIEL LUCIEN, in *Comptes Rendus des Séances de l'Académie des Sciences*, 1916, Second Half-year, Vol. 163, No. 19, pp. 525-527. Paris, November 6, 1916.

The Author has studied, in his garden at Erquy (France), the effects of continued capillary watering compared with the intermittent watering employed in market-gardening. For this purpose vessels with a large surface were used filled with water in which were dipped strands of wool or cotton which acted as syphons. The water thus supplied to each plant was easily calculated as well as being easily reduced or increased by altering the number of threads. This method of watering had for advantages: economy of water—no burning of the leaves, even if carried on in open sunlight—freedom from washing out of nutritive substances from the soil—loosening of the surface maintained to the highest degree.

Three series of experiments were started: in the first, lettuce, chicory, and cabbage were left almost entirely without watering;

in the second they received an abundant intermittent watering interrupted every 2 days; in the third they received capillary watering, which may be called continuous and in which the water was delivered at the foot of each plant by syphons of variable number.

The plants watered at too long intervals gave the worst results: the lettuce and chicory flowered. Those having intermittent watering, with larger amounts of water than those given by capillary watering, at first grew normally, but in the long run their leaves became red and hard or of an unequal green colour. Those plants having capillary watering always had turgid leaves of a fine green colour and showing perfect health. None of the foot watered plants flowered, which also happened for a fair number of specimens in the second series, although in less number than in the first.

The same system was tried for germinating seeds and afterwards watering the seedlings. 300 lettuce seeds, 300 headed cabbage seeds, and 300 radish seeds were used. The seeds were sown under similar conditions, divided into three lots and watered as in the previous experiments. The results obtained were:

	Number germinated		
	1st lot almost without watering	2nd lot inter- mittent watering	3rd lot continual watering
Batavia Lettuce	30	61	97
Cabbage	57	68	82
Radishes	43	57	80

It was found that continual capillary watering also gave plants much in advance of those of the other lots.

Anatomical study of the leaves, stems and roots has shown the differences that usually exist between plants suffering from drought and those with a normal supply of water.

With guaiacum stain, differences in the colouring of the latex of chicory were shown: the rapidity of the reaction and the intensity of the colouring were in proportion to good utilisation of the water. As the diastatic ferments did not act in the same way, it was explained by assuming differences in rhythmical development and in the nature of the products.

These experiments are of interest to both theoretical and practical horticulturists. The author thinks that it will be easy to provide cheap and simple appliances, using capillarity, in order to provide cultivated plants with the water that they require in any given soil.

43—Studies of Apples in Oregon.—I. WHITEHOUSE, W. E., A Study of Variation in Apples during the Growing Season in *Oregon Agricultural College, Experiment Station*, Bulletin No. 134, 18 pp.

- Corvallis, Oregon, June 1916.—II. KRAUSS, E. J., Variation of Internal Structure of Apple Varieties, *Ibid*, Station Bulletin, No. 135, 42 pp. June 1916.—III. KRAUSS, E. J., and RALSTON, G. S., The Pollination of the Pomaceous Fruits. Gross Vascular Anatomy of the Apple, *Ibid*, Station Bulletin, No. 138, May 1916.
- 44—Varieties of Cider Apples in France Suitable for Making Jellies.—TRUELLE, A., in *La Vie Agricole et Rurale*, Year VI, No. 46, pp. 357-361. Paris, November 1916.
- 45—Varieties of American Peach Trees Introduced into Italy.—ZAGO, F., in *L'Italia Agricola*, Year 53, No. 11, pp. 497-498. Plaisance, November 1916.
- 50—The Spruce and Balsam Fir Trees of the Rocky Mountain Region.—SUDWORTH, G. B., in *United States Department of Agriculture*, Bulletin No. 327 (Contribution from the Forest Service, Professional Papers), pp. 1-43. Washington, 1916.

LIVE STOCK AND BREEDING

- 51—The Comparative Values of the Intra-Dermal-Palpebral Mallein Test and the Examination of the Blood for the Diagnosis of Glanders.—FROHNER, in *Monatshefte für praktische Tierheilkunde*, Vol. 27, No. 9-10, pp. 416-424; No. 11-12, pp. 465-541. Stuttgart, 1916.

I. In 1915, the author was asked by the Prussian Minister of Agriculture to conduct comparative experiments on about 100 horses to decide the value of the eyelid mallein test and the examination of the blood.

From the point of view of diagnosis the two tests give practically the same results. Some cases of glanders can be proved by a blood test, and others rather by the eyelid mallein test. Thus the two tests should be combined in practice, especially if many horses are to be examined. Besides, they should be combined in such a case as when one or the other alone gives doubtful results. In cases of acute glanders, both tests may not uncommonly prove useless; then clinical examination is the surest and most generally sufficient method.

II.—From 1912 to 1916, the Prussian Minister of Agriculture again asked the writer to examine 151 horses which were to be slaughtered by order of the veterinary police as they were suspected of having glanders, as was indicated by the blood test. In 143 horses the presence of glanders was shown by the autopsy. The eyelid mallein test gave a positive result in 141 (*i. e.* 98.6 %) of the 143 glanders horses; in two it gave a negative result. Therefore the eyelid test failed in 1 to 2 % of the total number of cases of glanders. The blood test gave negative results in 5 cases out of 143, thus failing in 3 % of the cases.

For diagnostic purposes, the eyelid test is seen to be of equal value with the blood test, even for extensive researches. The author is therefore of the opinion that the combined use of the two tests should be legally enforced in Prussia in order to exterminate glanders by the veterinary police.

Many observations are given on the technique of the eyelid examination, the different methods of malleinisation and varieties of mallein, the beginning of the reaction in the eyes, the value of a rise in temperature correlated with the examination of the eyes, the proportion of leucocytes in the blood, etc.

- 53—Control of Contagious Epithelioma in Chickens by Vaccination.—MACK, W. B., and RECORDS, E., in *The University of Nevada, Agricultural Experiment Station, Bulletin* No. 84, 32 pp. Reno, 1916.

During the winter of 1914-15 and the following spring, contagious epithelioma of chickens was quite prevalent in Reno, Nevada. This disease is known in the United States by various names. Those in more common use are chicken pox, diphtheria in chickens, roup, canker, swelled head, sore head and la petite verole.

The authors had occasion to study the disease on an extensive scale, and the results of their work are published in the Nevada Experiment Station Bulletin.

- 54—Larkspur poisoning of Live Stock in the United States.—MARSH, C. D., CLAUSON, A. B., and MARSH, H., in *United States Department of Agriculture, Bulletin* No. 365, pp. 90. Washington, September, 1916.

- 55—Investigations of the Palm Kernel Cake, at Leeds University.—CROWTHER, C., in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 8, pp. 734-749. London, November, 1916. (4 pages in Institute Bulletin).

Results of investigations made during the past two years by several experimenters. The author discusses the question under the following heads: palatability, keeping properties, digestibility, influence on the yield and composition of milk and influence upon the composition of butter fat.

57—The Effect of Carrots on the Colour and Quality of Butter.—In *Mark Lane Express Agricultural Journal and Live Stock Record*, Vol. 116, No. 4440, page 457. London, 30 October, 1916.

The following experiment was carried out at Wye Agricultural College (England) to ascertain: 1) how long a period it takes before a change of colour becomes marked; 2) what is the minimum quantity of carrots required to alter the tint; 3) will a mixture of carrots and mangels answer the same purpose; 4) what effects have carrots on the churning character of the cream, the quality of the butter, and the percentage of fat in the milk.

For the experiment four cows of the Lincoln Red breed were picked out, the animals having calved down a few months previously.

Two of the animals were fed on 81 lb. of carrots and their ordinary allowances of cake, meal and hay. Two others were fed in a similar way, mangels being substituted for carrots. The records were taken in February and March, and the feeding reversed—i. e. carrots being substituted or mangels after the first month of the trial. The carrots used were Sutton's Red Intermediate.

A brief summary of the result is as follows:

Length of time before the effect on the colour is apparent. Butter made from carrot-fed cows.

1st week.—Very slight difference compared with that made from mangels-fed cows.

2nd week.—Difference more marked, less time occupied in churning and better grain and flavour.

3rd week.—A very good high coloured butter, considering the time of year.

On reversing the order of feeding, it was noticed that the colour was maintained in a diminishing degree over two or possibly three weeks, whereas the cows that had previously had mangels responded slightly to their change of food, and would, no doubt, have done much the same as the other cattle. The experiment did not last long enough to answer finally the question as to how few carrots will give the required tint, but it may be said that half mangels and half carrots gave a more saleable quality of butter than those getting a full ration of mangels.

The change of food had the effect of slightly lowering the butter fat in the milk of one cow, and practically made no difference in the others. In no case did it fall below 3 per cent.

59—Milk Production and Age.—WOODS, CHAS. D., in *Special Report of the Maine Agricultural Experiment Station for the Commissioner of Agriculture for the year 1914*, pp. 3-5. Orono, Maine, 1916.

In connection with the studies of the inheritance of milk production, in progress at the Maine Experiment Station, the problem of correction to apply to milk production records for the changing age of a cow has been studied and tables are being prepared by which it will be possible, knowing a heifer's milk record, to read off her probable production as a mature cow. Furthermore, it will be possible for a dairyman to give each one of his cows an absolute rating in comparison with advanced registry animals of the same breed at any given age. If he will keep a milk record, he can, with the help of these tables, say whether or not a particular cow is better or worse and by what proportion, than the average of advanced registry cows of the same age. The work on Holstein-Friesian and Jersey cattle is now practically completed.

61—Advances made in 1916 by the Four Leading American Breeds of Dairy Cows.—CALDWELL, W. H., (Secretary American Guernsey Cattle Club), MAC-MONNIES, W., (Chief Extension Dep. Amer. Jersey Cattle Club). VANDER-SLICE, J. A., (Holstein Friesian Association). WINSLOW, C. M., (Secretary Ayrshire Breeders Association).—*The Field Illustrated*, Vol. XXVI, No. 10, pp. 836-837. New York, October, 1916.

62—The Selection of Dairy Cattle and the Development of Cooperative Associations for the Control of Milk Production in the United States, from 1906 to 1916.—*Hoard's Dairyman*, Vol. LII, No. 15, p. 509. Fort Atkinson, Nov. 3, 1916.

The movement in favour of cooperative associations of breeders and producers for the control of the individual production of dairy cows, in view of selection, had its origin in Michigan in 1906. In the course of the last ten years this movement has extended to 38 States, and now includes a total of 346 Associations. A table in the article in the Institute Bulletin shows the development of these societies from the beginning.

46—Karakul Sheep Breeding in South Africa.—(1) HOLM ALEX., (Under-Secretary of Agriculture) in *The Agricultural Journal and Small-holder of South Africa* Vol. III, No. 18, pp. 168-174. Johannesburg, June, 1916. (3 pp. in Institute Bulletin). See also Bulletin of Foreign Agricultural Intelligence, November, 1916, No. 668.

65.—Experiments in Feeding Maize Silage to Lambs at the South Dakota Experiment Station, U.S.A.—WILSON, JAMES W., in *Dept. of Husbandry, South Dakota State College of Agriculture and Mechanic Arts*, Bulletin No. 165, pp. 377-390, 7 fig. Huron, S. D., April 1916. (3 pp. in Institute Bulletin).

The above bulletin includes the results of two experiments in feeding maize silage to lambs. It also includes results of other experiments in feeding lambs reported in previous bulletins now out of print.

The results show that maize silage is not suitable as the sole roughage ration for fattening lambs with grain. On the other hand, by adding a small quantity of maize silage to the lamb's ration, more uniform and larger gains were made than with lambs not receiving any maize silage.

67—**Studies on the Physiology of Reproduction in the Domestic Fowl: Dwarf Eggs.**—PEARL RAYMOND and CURTIS, MAYNIE, R., in *Journal of Agricultural Research*, Vol. VI, No. 25, pp. 977-1042 + Pl. CXII-CXIII. Washington, Sept. 18, 1916.

Researches carried out in the Biological Laboratory of the Maine Agricultural Experiment Station, United States.

Eggs much smaller than normal eggs are occasionally produced by domestic fowl of all breeds. These eggs usually contain little or no yolk, but occasionally a small yolk, usually unfertile but inclosed in a complete vitelline membrane. The albumen is small in amount, and often, but not always it is of a thicker consistency than the albumen of ordinary eggs. The egg membranes are normal. The shells vary in thickness over the same range as the shells of normal eggs. Sometimes it is entirely lacking, and then the egg is simply covered with a membrane. The writers suggest the name dwarf eggs for these small eggs. Among the various types of abnormal eggs produced by the domestic fowl, the dwarf egg is more common than any other type, except the double-yolked egg. In their article the writers describe:

1) The different types of dwarf eggs, both as regards shape and contents.

2) Their variation in size and shape.

3) The interrelations of the variations in dimensions, shape and size.

4) The frequency of the occurrence of dwarf egg compared to normal eggs and of dwarf egg producers compared to birds which do not lay dwarf eggs.

5) The seasonal distribution of dwarf eggs.

6) Dwarf egg production by fowls with normal and with pathological oviducts.

7) The relation of dwarf egg production by normal fowls to the age of the fowl, and the position of the egg in the litter and clutch.

7) The physiological conditions leading to dwarf egg production.

9) The relation of dwarf egg production to other abnormal phenomena of repro-

duction which occur in nature, or have been experimentally produced.

10) The contribution which the study of the physiology of the production of dwarf eggs makes to our knowledge of the normal physiology of egg production.

The results of this study are summarized in this article and their meaning explained in thirty-six numbered paragraphs. The significance of a few of the results is here given as follows:—

18) From 1908-1916, 5.15 per cent of all the fowls kept at the Maine Agricultural Station are known to have produced at least one dwarf egg.

19) Both the actual dwarf egg production and the number of dwarf eggs per 1000 eggs is lowest during the winter months. It increases through the spring, reaching a maximum in the early summer.

20) In general, the season of high normal egg production is also the season for high dwarf egg production both actual and relative to normal egg production. The maximum of dwarf egg production, however, occurs later in the season than the maximum normal egg production.

21) The production of a dwarf egg is usually an isolated phenomenon occurring only once or twice during the life of a bird. Only 3.5 per cent of the fowls which produced one or more dwarf eggs produced more than 2.

22) A study of all the egg records and the available autopsy records for fowls which produced one or more dwarf eggs shows that in most cases the disturbance which caused the production of the dwarf egg was of temporary character, and was not correlated with a morphological disturbance of the sex organs.

68—**Trigona williana and Trigona amalthea, Wild Bees attacking the Hive Bee in the Amazon Region, Brazil.**—VAN EMBLEN AMERO, in *Chacaras e Quintaes*, Vol. XIV, No. 4, pp. 758-759. 1 Fig. San Paulo, October 15, 1916.

The Director of the Agricultural Experiment Station of Cachoeira Grande, in the Amazon Region, has sent to the Author specimens of *Trigona amalthea* Oliv. and *T. williana* Friese, which have completely destroyed the hives of *Apis mellifica* belonging to the Station.

The author describes these two enemies of the hive bee and recalls that a few years ago he had attempted to introduce the breeding of *Apis ligustica* (Italian bee) and of *Melipona* sp. ("Mandaca" bee) into Ceara, but the *Trigona* exterminated the swarms of the two species in spite of preventive measures (destruction of the nests of the enemy insects).

FARM ENGINEERING

72—A New Device to Increase the Power of Tractors.—*Le Génie rural*, Year 8, No. 64, pp. 10-11, 2 fig. Paris, October, 1916.

78—A Device for the Automatic Regulation of the Humidity of the Air.—*Scientific American* Year 72, No. 41, pp. 355. New York, October 14, 1916.

80—The Ventilation of Farm Buildings.—I. GRISDALE (Director, Dominion Experimental Farms) and ARCHIBALD, E. S., in *Dominion of Canada, Department of Agriculture, Dominion Experimental Farms Bulletin* No. 78, pp. 32, fig. Ottawa, May, 1914.—II. *The Agricultural Gazette of Canada*, Vol. 3, pp. 598-600, fig. Ottawa, July, 1916.—III. TRUEMAN, J. M., the King System of Ventilation, *Ibid.*, pp. 615-618, fig.

81—Arrangement for Securing the Safety of Horses in Case of Fire.—*Scientific American*, Vol. CXV, No. 15, pp. 326 and 338, 2 fig. New York, October 7, 1916.

A device used in a stable in Los Angeles (U.S.A.), composed of ordinary stalls, provided with mangers and racks; the end of the stall by the horse's head is closed by

a door so mounted that it opens by its own weight as soon as the holding bolts are withdrawn. The bolts are controlled by a wire running along the wall of the stable and which has easily fusible plugs placed at equal distances apart. If fire occurs anywhere, the plugs melt, open the bolts and the door of each stall automatically opens. At the same time, a door closes at the entrance to the stall, preventing the animal from going into the stable. In addition, the mangers fall automatically, thus freeing the halter; the noise caused by the opening and closing of the doors and the fall of the mangers, is sufficient to frighten the horses which, as has been shown by experiment, quickly escape by the outlet that opens in front of them.

82—A Portable Sheep Shelter on a Farm in Central New York.—*The American Agriculturist*, Vol. 98, No. 16, p. 8, New York, October 14, 1916.

This comparatively cheap apparatus protects the sheep from the hot sun in summer and serves as a shelter for the sheep to huddle together on cold nights in spring and autumn. It consists of a 4-sided roof mounted on 4 broad-tired wheels, which enable it to be easily moved about.

AGRICULTURAL INDUSTRIES

92—The Preparation and Uses of Wood Flour.—KRESSMANN, F. W., in *Scientific American*, Vol. LXXXII, No. 2127, p. 229. New York, October 7, 1916.

Wood flour is ground or milled wood that has been screened so as to remove coarse particles and also to give a certain uniformity of size. It is usually sold as 40, 60, or 80 mesh (bronze wire screens having 40, 60, or 80 meshes per linear inch). In one specification, 20 per cent of the flour must pass through an 80 mesh, 50 per cent through a 60 mesh, and 100 per cent through a 50 mesh screen.

Before the war, wood flour was delivered at the Atlantic ports of the United States for from \$12.50 to \$15.00 per ton, and domestic material had to compete against this. The production in the United States is mostly controlled by one firm though mills are scattered all over the country from Maine to California.

Wood flour is principally used in the manufacture of dynamite, linoleum, artificial plastics and flooring, and as an inert absorbent in many industries.

In 1909, the amount of wood flour used for making dynamite amounted to about

20 million pounds, and is increasing every year.

93—The Pasteurisation of Milk for Cheese-Making.—STEVENSON, C., and GRANT, W., (Dairy Instructors, Taranaki, New Zealand), in *New Zealand Department of Agriculture, Industries and Commerce, The Journal of Agriculture*, Vol. XII, No. 6, pp. 440-445, 3 fig. Washington, June 20, 1916.

According to the writers, (dairy-instructors at Taranaki, New Zealand) it was hitherto thought impossible to pasteurize the milk used for cheese-making on account of the large quantities of milk to be dealt with in the limited time available for the purpose, and the high cost of the necessary heating. The increase in fuel consumption was from 15 to 20 per cent. A saving, however, can be effected by using a regenerative heater. Where water is scarce, the waste water can be cooled and used again. The best pasteurizing temperature is from 71° to 75° 5 C. If the temperature is raised to 79° C., or above, the addition of 1 oz to 1½ oz. of hydrochloric acid per 100 gals. of milk, before adding the rennet, will be found to be an advantage.

Benefits derived from the pasteurisation.—The loss of milk which occurs in exceptionally warm weather of long duration is avoided.

There is a considerable increase in the amount of butter fat incorporated in cheese made from pasteurized milk. Instances of this were observed at Taranaki, for since pasteurisation has been adopted, not a single second grade cheese has been manufactured (a large percentage being obtained before), and the factory's average grade has risen from 89 points to 92. Thus the factory saves $\frac{1}{2}$ cent per lb., which was the deduction for second grade cheeses. These satisfactory results have induced cheese manufacturers to increase the number of plants for pasteurizing milk; from 7 in 1914-15 they have increased to 32 in 1916.

A complete plant of 1,800 gallon capacity can be installed for \$1,500.

It should not, however, be supposed that the good effects of pasteurisation lessen the responsibility of the farmer as regards the quality of the milk, which will always remain the chief factor in determining the quality of the cheese made.

For instance, an experiment at Taranaki has shown that turnips fed to cows impart to the milk an unpleasant flavour which cannot be entirely eliminated by pasteurisation at 87.7° C.

94—On the Mechanical Protection and Conservation of Eggs.—ARNOUX ANDRE,

in *Comptes Rendus de l'Académie des Sciences*, 1916, 2nd half year, Vol. 163, No. 23, pp. 721-722. Paris, 1916.

The writer has sought a practical and cheap method for helping transport and conservation and requiring no special apparatus. To do this, the egg is wrapped in a soft envelope formed by bands of tissue which are dipped in a mineral paste that hardens and protects the egg.

Amongst the substances suitable for this, silicate of soda, already used for this purpose, gave the best results. The egg thus preserved is protected from shock and travels as if in a box. In practice the egg is still quite fresh at the end of about a month.

For consumption the egg is dipped into tepid water, when the mineral paste easily dissolves. Envelopes other than bands of tissue may be employed (wadding, saw-dust, etc.); and other food products are capable of being similarly protected.

95—The Strength of Eggshells.—HERRASTI G., in *Scientific American*, Vol. XCV, No. 15, p. 321, 1 fig. New York, October 7, 1916.

The strength of eggshells has been ascertained by placing them on the plate of a pair of scales and submitting them to gradual pressure by means of a lever and jack. It was found that coloured egg shells are stronger than white ones. The average breaking pressure for brown shells reached 154.8 lb., while white shells only required 112.4 to break them.

PLANT DISEASES

96—The Noxious Action of Sea-salt deposited on Sea-shore Plants.—DUFRENOY JEAN, in *Comptes Rendus des Séances de la Société de Biologie*, Vol. LXXIX, No. 17, pp. 914-916. Paris, 1916.

100—"Uspulun" a New Preparation for the Treatment of Cereal Grains against Fungoid Diseases.—WEEK in *Illustrierte landwirtschaftliche Zeitung*, 36th year, No. 82, p. 552. Berlin, 1916.

A new preparation for the treatment of seed of grain known as "Uspulun", has been placed upon the market and is said to be capable of destroying all fungal spores occurring on the surface of the grain. The diseases in view are chiefly "stinking smut of wheat", the *Fusarium* attacking wheat and rye, *Helminthosporium gramineum* of barley and, according to ERIKSSON, "loose smut of oats" (*Ustilago avenae*). The remedy might also be adopted for seed attacked by bean anthracnose

(*Gloeosporium Lindemuthianum*) and pea anthracnose (*Ascochyta Pisi*).

The active principle contained in the remedy is chlorophenate of mercury, in the proportion of about 2%. The remaining 80 % is made up of various agents intended to render the preparation more soluble and to protect it from moisture.

The mercury content is about 12%. To ensure recognition of seeds treated with "Uspulun" a blue colouring matter has been added.

Experiments covering a period of three years have been carried out at the Agronomical Institute of Giessen University in order to determine the effect of "Uspulun" treatment on the germination of the seeds and on the action of the fungi during germination.

It was also wished to determine whether "Uspulun" really constitutes an effective remedy for the control of "stinking smut". If so, the next question to be studied is that of expense. For comparative purposes

the seeds were also treated with copper sulphate, formalin and sublimate.

I.—*Effect on Germination and Action of the Fungi.*—The seeds were immersed in the "Uspulun" solution and allowed to remain there for some time. No spraying was carried out, the effect of the solution on the germination capacity being less marked by this method than by the immersion process.

The germination energy and germination capacity of rye and barley were increased several degrees by the treatment with "Uspulun".

The germination energy shows a stronger increase than the germination capacity. The reason is to be found in the destruction of the fungi, especially of *Fusarium*, which impeded the course of germination in the non-treated samples.

The favourable effects of the treatment were shown still more distinctly in the case of the determination of the growth capacity. The optimum value of concentration of the solution was almost in every case from 1:200 and 1:400 (the instructions given by the manufacturers say: 1:400). Rye forms an exception as its germination energy only shows an increase with the weakest of all the solutions i. e. 1:800. Treatment with "Uspulun" produces no increase in the germination capacity or in the growth capacity of barley and oats.

Sublimate (15 minutes immersion in a 0.1 % solution) diminished the germination energy of wheat. On the other hand the germination capacity remained unchanged. There was a distinct increase in the growth capacity in comparison with the non-treated samples, as was also the case with "Uspulun" this increase, however, was 20 % less than with "Uspulun". The germination capacity and the growth capacity were the same as those of the samples treated with "Uspulun". The growth energy and the growth capacity showed an increase of nearly 10 % on those of the non-treated samples.

The treatment with sublimate had no adverse action whatever on the germination capacity and growth capacity of barley and oats; however, it lowered the germination energy of the barley.

The wheat grains seemed to have suffered no damage from an immersion of a quarter of an hour in a 0.1 % solution of formalin. The germination capacity and the germination energy remained the same as for the non-treated seeds. On the other hand there was a big difference in the growth capacity.

The effect of formalin on rye was similar. The germination value was slightly diminished for oats and remained unchanged for barley.

Copper sulphate (0.5 % solution; 15 hours immersion) usually had a very deleterious effect on the germination of rye and wheat.

It is true that a subsequent treatment with milk of lime caused an appreciable improvement in all the factors, however, they were superior to those of the untreated samples in one single case only (growth capacity of wheat). The results of treatment with copper sulphate were no better for barley and oats, although in this case also, the factors may all have been considerably improved by a subsequent treatment of the seeds with milk of lime.

Treatment with "Uspulun" surpasses all the other methods examined. Next comes corrosive sublimate, and then formalin and finally copper sulphate, with and without treatment with milk of lime.

II.—*"Uspulun" as a remedy for "stinking smut"*. As early as 1915, field trials were made on the control of "stinking smut" and "loose smut of oats" but without result owing to the failure to produce artificial infection by means of spores. A new attempt was made in 1915 with autumn wheat severely attacked by "stinking smut" and this time the experiment was successful. The results are as follows:

Treatment of seed		Growth	Proportion of wheat attacked by stinking smut
Untreated	washed	good..	37.8
	dry..	"	50.8
"Uspulun"	immersed	very good..	0.0
	sprayed	"	1.5
Sublimate	immersed	slightly irregular	0.0
Copper sulphate	immersed	irregular with gaps	0.0
Copper sulphate followed by treatment with milk of lime			0.27
Formalin		good	0.1

The expenses of treatment with "Uspulun", when the spraying method is adopted, are from 6½ to 8 cents per acre for wheat; from 5 to 6 cents per acre for

rye. The immersion method comes dearer for small quantities of seed, but comes as low as 8 cents per acre for large quantities.

AGRICULTURAL ECONOMICS

FEDERAL BANKS AND FINANCIAL OPERATIONS IN THE UNITED STATES

Financial and banking organization in the United States, certain defects of which were repeatedly pointed out by financial experts and economists and were thrown into relief by the crisis of 1907, has undergone in recent years a significant transformation.

Recurrent and multiplied attempts, and also numerous failures, profound study and the resultant minute knowledge of the country's real needs and political necessities, seem at last to have led the government of the States to institute a new organization of banking, grafted on the surviving trading organization and aiming at providing remedies for the crisis which may eventually threaten the equilibrium of the money market.

The law of 23 December 1913, which created the Federal Reserve Banks, gives its bases to the new system and is modified and amplified by a law of 7 September 1916, which is connected at several points with the law on agricultural credit of 17 July 1916.

The new organization represents, as we shall show in examining its outstanding features, a measured compromise between two political and economic principles—complete centralization and localization—which in turn have left their mark on the law and administration of the North American republic since first it was formed, and which the force of experience and of a union of social forces tend more and more to merge.

The article first gives a general review of financial organization in the United States. After two attempts to form a federal bank Congress decided to care in future for its own funds, instituting, under the control of the administration, centres of deposit and sub-treasuries in the principal towns. This was the so-called system of sub-treasuries which was adopted in 1846 and is still in force, but has been amended to allow surplus funds to be deposited in the National Banks. In this period the number of "State" Banks privileged to issue circulating notes, increased largely. The National are differentiated from the State banks because they may be founded in any territory of the union and issue notes, secured by a pledge of United States stock, which are legal tender.

The lack of elasticity in the financial system, which rendered it unable to meet the crisis of 1907, caused Congress to decree that there should be a National Monetary Commission, charged to examine the financial and banking situation in all its aspects in the United States and in the

principal European countries. This commission favoured a greater centralization of the banking system. It did not however propose the establishment of a single federal bank on the model of the great national banks of Europe, but the creation of a Reserve Association of America which would have the necessary authority and means to increase and reduce the volume of paper money in circulation as circumstances demanded. Congress on 23 December 1913 voted the Act creating the Federal Reserve, in accordance with the principles and the hopes which the commission had enunciated.

In accordance with this Act the territory of the Union was divided into twelve districts and it was decided that the banks should be at Boston, New York, Philadelphia, Cleveland, Richmond, Atlanta, Chicago, St. Louis, Minneapolis, Kansas City, Dallas and San Francisco. Every National Bank is required to subscribe to the Federal Reserve Bank of the district in which it is situated six per cent of its own paid-up capital stock and surplus in gold or gold certificates. If the capital thus subscribed be insufficient a certain amount of the stock may be allotted to the government. No Federal Reserve bank may begin business with a subscribed capital less than \$4,000,000.

Each Federal Reserve Bank is under the supervision and control of a board of nine directors, of whom three represent and are chosen by the stockholding banks, three must when elected be actively engaged in their district in commerce, agriculture, or other industrial pursuit, and three are nominated by the Federal Reserve Board. The chairman of the board of directors is chosen by the Federal Reserve Board from the last named three, and also has the office of federal reserve agent, acting as official representative of the Federal Reserve Board for the performance of the functions conferred on it by the Act.

The Federal Reserve Board which meets in Washington is the motive power of the whole system. It has seven members, namely the Secretary of the Treasury and the Comptroller of the Currency who are members *ex officio*, and five others appointed to hold office for ten years by the President of the United States with the consent of the Senate. In appointing them the President has due regard to a fair representation of the different commercial, industrial and geographical divisions of the country, and he designates one of them as governor and one as vice-governor of the Federal Reserve Board, the former being the board's active executive officer.

Previously National Banks were obliged to have a reserve equal to 25 per cent of the amount of their deposits in the reserve towns and 15 per cent in the other towns; but the Act of 1913 made this percentage 18 in New York, Chicago and St. Louis, 15 in other reserve towns, and 12 in non-reserve towns. The excesses of available reserves should be transferred in accordance with certain conditions to the Federal Reserve Bank.

For twenty years from 1915 the member banks of a Federal Reserve Bank may apply to sell all or some of their circulating notes which they desire to retire. The Federal Reserve Board will decide on such applications. A Federal Reserve Bank may not purchase more than \$25,000,000 of such bonds in a year. Upon depositing with the Treasurer of the United States bonds so purchased, or any bonds with the circulating privilege acquired under this Act, any Federal Reserve Bank shall receive from the Comptroller of the Currency circulating notes in blank equal in amount to the par value of the deposited bonds. Such notes shall be issued and redeemed on the same terms and conditions as National Bank notes, except that they shall not be limited to the amount of the capital stock of the Federal Reserve Bank issuing them. Thus the circulation of notes will eventually be appreciably simplified and unified.

The law perfects the machinery for controlling the banks. In addition to the inspections by the Comptroller of the Currency, inspection of any bank by the Federal Reserve Bank of its district can be authorized by the Federal Reserve Board. The Federal Reserve Banks are themselves inspected annually and their member banks can obtain that they be inspected specially.

Both abroad and at home these banks are the government's fiscal agents, and as such recover taxes and duties, pay arrears of the public debt, etc.

The Federal Reserve Banks were opened on 16 November 1914. Of the 7,493 National Banks which were active only eighteen refused their subscription. In June 1916 the paid-up capital amounted to \$54,864,000. On 17 June 1916 they held United States bonds for \$59,000,000. Of municipal bonds, which are far less liquid, they then held \$22,300,000. Their foreign paper amounted to \$64,953,000.

On 10 November 1916 the liabilities of the Federal Banks amounted to \$650,000,000, represented as to one-tenth by the paid up capital stock and as to nine-tenths by the deposits of stockholding banks. Their own bills have hitherto circulated little, circumstances not rendering them necessities. Their assets amounted to \$400,000,000 in gold, \$110,000,000 in paper, a cer-

tain quantity of their bills, and accounts with neighbouring banks.

The unification which the federal reserve system was designed to effect was shown first by the adoption of a method of weekly settlements of accounts among the various federal banks, the difference between the debit and credit sides of such accounts being rectified by a remittance of specie or bills. The displacement of assets from one district to another is thus reduced to the minimum. In the second place since 15 June 1916 the recovery without charge of cheques and bills has been enforced by the Federal Reserve Board.

The Act of 1916 has enlarged the activity of the Federal Reserve Banks, notably in that it allows them to accept bills of exchange of home origin which are sufficiently guaranteed. It further allows the Federal Reserve Board to authorize "member banks to carry in the Federal reserve banks of their respective districts any portion of the reserves" previously required to be held in their own vaults; and in that it increases the facilities of member banks for short term credit, secured by bills not actually discounted. Any national banking association may apply to the Federal Reserve Board for permission "to establish branches in foreign countries or dependencies or insular possessions of the United States for the furtherance of the foreign commerce of the United States and to act if required to do so as fiscal agents of the United States".

Owing to the initial deposit of the reserves of member banks and the transfer allowed by this Act the Federal Banks now hold about a quarter of the country's grand stock of gold.

Such is in outline the financial and banking system instituted in 1913 and revised in 1916. It is seen to have involved no radical upheaval of the previous organization. It merely added some new wheels which centralized, and in some respects gave a new direction to the complex and somewhat unequal mechanism constructed since the beginning of the republic. The State Banks, the National Banks, the sub-treasuries, the circulation emanating from banks in direct contact with the people and secured by Federal debt bonds, were not abolished. They subsist. But the concentration of a considerable part of the national gold reserves in a small number of Federal banks, which could issue Federal notes in case of need, makes incontestably a regulating force in the money market, and will probably ensure the normal course of commercial and banking operations in times of crisis.

(Summarized from the *International Review of Agricultural Economics*, April 1917).

WOMEN WORKERS ON THE FARM IN BRITAIN

The suitability of women to perform many of the branches of farm and horticultural work was recognized at an early date of the war, and in order to promote their employment special steps were taken by the Board of Trade, acting in conjunction with the Board of Agriculture. The progress made in the substitution of women for men in agriculture has been slow, and is in no way commensurate with that achieved in industrial and commercial occupations. The difficulties attendant on the work have been most serious. Prejudice on the part of the farmers, reluctance on the part of the women, insufficiency of housing accommodation, lowness of wages, have all proved serious obstacles.

To try to overcome these difficulties, a campaign of propaganda work was instituted in the spring of 1915 by the Board of Agriculture and the Board of Trade. As a result of the combined action of the boards, local voluntary committees, known generally as Women's County War Agricultural Committees, have been formed. At the present time there are sixty-three such committees, whose function is:

1) To carry on propaganda work to promote the employment of women in agriculture.

2) To register women, and arrange for placing them in work and for their training—where necessary.

3) To increase the production of home-grown food in every village.

The organization which it has been sought to establish has been in the nature of a county committee working through local committees or village registrars—the usual procedure being to divide the county into districts, each having a representative. The representatives form the county committee, in charge of the general organization and each of them is responsible for the work carried on in his or her own locality by means of a district committee or a registrar, or both, appointed in each village. There are now 1,060 district representatives and 4,000 village registrars. In some cases the Women's County Committees have a separate existence, although they work in co-operation with the men's County War Agricultural Committees, called into being by Lord Selborne in August 1915. In others they are sub-committees of the War Agricultural Committees.

A certificate has been issued to workers at the discretion of the committees, at the time of registration or only after proved service, or in some cases not at all. After they have completed thirty days' service on the land, registered women are entitled to wear a government armband of green baize which bears the royal crown in scarlet.

72,021 certificates and 62,000 armlets have been issued.

It has been very difficult to obtain statistics from the committees and such as they have supplied are not reliable. The approximate returns indicate that nearly 140,000 women have been registered, including all who have volunteered both for whole and for part time service. In certain counties—as Northumberland, Wilts, Devon, Kent and parts of Lincolnshire—and also in Wales, women have always been on the land in large numbers, and many of these do not care to register as they think that by so doing they may make themselves liable to some form of compulsory service. In one of the divisions of Lincolnshire, for instance, 599 women have been returned as registered and 2,041 as working; and in many villages the registrars can give no accurate idea of the number working as the farmers so frequently make their own independent arrangements. It appears that the comparatively small demand by farmers for the service of women up to the last few months has been due in the main to the following reasons:

(1) The number of farm labourers exempted.

(2) The fact that the shortage of labour has been largely met by:

- a) Release of soldiers.
- b) Release of school children.
- c) Increased use of machinery.
- d) A lower standard of cultivation.

(3) The unwillingness on the part of large numbers of farmers to employ women.

(4) The difficulty of providing accommodation for imported women. The housing problem in rural districts, already existent before the war, has been much intensified by the fact that the wives and families of men who joined the colours have been permitted to remain in their cottages. The result of this has been that the farmer has often been unable to replace the men by other men or by women.

The work undertaken by the women worker on the land is of a diverse character, and includes some occupations which do not in any way, as a rule, fall within the women's province.

The following is a list of occupations in which women have been and are now engaged in various parts of the country:—

1. General farm work—(a) cleaning land; (b) stone picking; (c) weeding; (d) thistle cutting; (e) manure spreading; (f) singling and hoeing turnips; (g) potato setting and lifting; and (h) vegetable planting and transplanting.
2. Milking.
3. Stock tending and rearing.
4. Butter

making. 5. Cheese making. 6. Poultry rearing. 7. Haymaking. 8. Harvesting. 9. Sheep shearing. 10. Thatching. 11. Stacking. 12. Ploughing. 13. Loading and unloading. 14. Threshing. 15. Fruit picking. 16. Hop picking. 17. Reed stripping. 18. Bark pulling. 19. Timber felling. 20. Gardening—(a) jobbing; (b) market gardening; (c) domestic gardening;

(d) cultivating allotments and waste land; and (e) co-operative gardening.

The experience gained during the war goes to prove that some women can do anything and everything on the land, and do it well, but that the average woman is useful chiefly for occupations 1 to 7 and for 15, 16 and 20. In numbers 2 and 3 they have shown themselves very successful.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the April number of the *International Review of Agricultural Economics*. Persons interested in any of the articles in this list may obtain the original bulletins on application to the Institute Branch, so long as the supply for distribution is not exhausted.

	Page
Progress of Agricultural Co-operation in British India 1914-15 ..	1-6
Collective Dairies in Italy ..	7-18
Popular Co-operative Credit in Russia from 1914 to 1916 ..	19-27
The First Thrift Conference and the Savings Banks of Chile ..	37-49
Mortgage Insurance in Uruguay ..	50-53
Subdivision of Land in Old Bavaria ..	77-83
Farm Tenancy in the United States ..	90-99

AGRICULTURAL STATISTICS

FOREIGN CROP CONDITIONS

THE following is a summary of the information on crop conditions on July 1st given in the July number of the *International Crop Report and Agricultural Statistics*:—

The hot weather and rains which have prevailed during June throughout western and southern Europe have been favourable for all crops, improving the outlook for the greater portion. In France, in Great Britain, in Ireland and in Italy a very notable advance is reported as to the winter-sown crops, which had suffered from the rigour of the season, so generally; so that though a yield above the average is out of the question, the present forecast is much more propitious than could have been expected from the recent state of these crops.

The *spring-sown crops*, generally speaking rather later than usual, have made up for lost time as a consequence of last month's weather, and their condition is almost everywhere an entirely satisfactory one. In northern and central Europe, on the contrary, there is still room for complaint as regards the growing crops. In Denmark the present situation points to a crop decidedly below average, and gives cause for some anxiety. In Sweden the crops have made but little growth owing to the cold winter, the lateness of the spring and the serious drought which has

lasted so long in that country. In Switzerland, on the other hand, the winter crops are well advanced in spite of drought, and an average yield is expected. The spring crops have felt the effects of the dry weather more decidedly. The same conditions prevail in European Russia, where an important improvement in crops is reported to be principally due to the recent rainfall.

The condition of the *wheat* crop on July 1st, 1917, was good in Spain, average in Ireland, Italy, Switzerland, and the United States, while it was mediocre in Denmark, Great Britain and Sweden. *Rye* is doing well in Spain and Ireland; it is in average condition in Italy, Switzerland and the United States; and mediocre in Denmark and Sweden. The *barley* crop is good in Spain, Scotland and Ireland, average in England, Italy, Switzerland and the United States, and mediocre in Denmark and Sweden. As regards *oats*, the outlook is good in Spain and the United States, average in Scotland, Ireland, Italy, Switzerland. It is mediocre in Denmark, England and Sweden. *Corn* looks well in Spain, Italy and Switzerland, and is in average condition in the United States.

The August report of the United States Department of Agriculture predicts a wheat crop of 663,000,000 bushels, compared with a harvest of 639,886,000 in

1916. The estimates for the other crops are:—Corn 3,191,000,000 bushels against 2,583,000,000 last year; oats 1,456,000,000 against 1,251,992,000; barley 203,000,000 against 181,000,000; potatoes 467,000,000 against 285,000,000.

Broomhall's latest crop cable issued August 28th, is as follows:—

United Kingdom.—Rains have caused some damage in the south, elsewhere rain caused delay in threshing and early movement. Wheat prospects fair, with quality good. Oats fair, potatoes excellent, and hay abundant.

Russia.—Crop reports varied; in important spring wheat section outlook bad, and enemy's troops have invaded a large section of Bessarabia. Stocks everywhere are Government owned, and new movement is light.

Rumania.—Crop outlook good and harvesting finished, but Russian retreat makes it difficult to expect saving the crop.

Bulgaria.—All advices are highly favourable. A large crop was harvested of wheat and oats. Movement overland large.

Greece.—All neutral advices via Switzerland reports severe storm damage. Bread rationing increased.

Italy.—Wheat crop giving average yield; owing to reduced acreage total yield will be much under last year. Stocks small and foreign arrivals increasing.

Spain.—Weather favourable, and harvest reports keep favourable.

France.—Weather generally more favourable. Harvesting reports keep fairly favourable as to quality, but yield disappointing. Import needs large, and purchases from foreign sources large, with arrivals of both wheat and oats liberal.

North Africa.—Crops of fair quality and quantity.

Scandinavian Peninsula.—Rains came too late. Cereal and hay crops well below average. Supplies small and purchases difficult, with arrivals at all ports practically nothing.

Australia.—Weather favourable. Large decrease in acreage confirmed. Stocks continue heavy.

DOCUMENTARY LEAFLETS OF THE INTERNATIONAL INSTITUTE OF AGRICULTURE

THE Bureau of Statistics of the Institute has inaugurated the publication of various items which are outside the scope of information hitherto furnished by the Bulletin of Agricultural and Commercial Statistics. The new information will be published in supplements entitled "Documentary Leaflets." The items will be selected with the view of supplying a review of the agriculture of various countries and of all kindred questions, to be made as complete as possible. The data will deal especially with yield, trade, stocks, prices, rates of freight, etc. The information will generally be from official sources, but if it is considered advisable to publish non-official data the authority will be quoted. The new publication will make it practicable to supply the world at large with most useful information concerning a great number of products, such as rubber, cocoa, tea, jute, wood, fruit, meat, hides, etc.

The first issue of the "Documentary Leaflets," which will be distributed with the "International Crop Report and Agricultural Statistics," has been received at the office of the Canadian Commissioner.

Following are summaries of some of the items:—

Exports of Jute from British India.—The following data was furnished by the Director of Statistics of British India:—

	1915 metric tons	1916 metric tons.
Jute (raw)	659,445	532,468
Jute (manufactured):		
Bags (estimated)	453,756	486,054
Cloth (estimated)	312,324	322,770
Twist and yarn	82	1,566
Rope and twine	3,689	3,963
Totals	1,429,296	1,346,821

Requirements for Cereal Consumption in the Netherlands.—The consumption of cereals in the Netherlands in 1916-17, compared with the estimates of normal requirements as published in the "Statistical Notes of the Institute."

	Home grown crops in 1916 + imports in 1916.	Total normal requirements for consumption in 1916-17 according to the tables of the Institute.
	Bushels.	Bushels.
Wheat.	32,191,000	30,497,000
Rye	11,192,000	23,747,000
Barley	8,061,000	11,161,000
Oats.	21,852,000	26,047,000
Corn.	27,514,000	28,337,000

Cost of Wheat in France.—The Journal Officiel of France, dated June 30th, 1917, reports a speech in the Senate on the previous day by Mr. Millies-Lacroix. It contains interesting information as to the results of the measures adopted for food

supply as regards wheat. The following is a quotation from the speech:—

"The food supply service was definitely organized in October, 1915. The law of October 16th, 1915, entrusted to this service the arrangements for wheat and flour supplies for the civilian population, and placed at its disposal a credit of \$12,000,000 as working capital. In order to keep in touch with current receipts and payments, a special account was opened, taking credit for the amount of working capital voted, as also for cash received against deliveries of wheat and flour and by requisition, and with supplementary expenses of transport, loading and discharging, receiving and hauling, warehousing, holding and distribution of the goods.

"A quarterly statement of profit and loss must be supplied to the Finance Minister. I have inserted in my report some extracts from these statements. The first one, after about a year's transactions, showed a loss of \$28,400,000, to which amount should be added customs duties and registration fees paid by the service, together with sundry charges incurred by receiving agencies, etc. At a later date the loss increased from \$28,400,000 to about \$80,000,000; to which again should be added \$45,000,000 customs duties and registration fees, with agency charges. The payments have now reached an amount approximating \$340,000,000, and the receipts have been about \$175,000,000, leaving a deficiency of \$165,000,000. I should state that this deficiency was not unexpected by Parliament, where it was known that, in creating the food supply service, serious loss was likely.

"M. Joseph Thierry, Finance Minister, gives us information which includes the following statement. I have no wish to enter into details of the transactions, but I may say that the deficiency chiefly arises from the distribution of wheat by the Government at \$1.70 per bushel on an average, costing at least \$2.50. Foreign wheat is very dear; it has risen to \$3.90 per bushel, including insurance and freight, particularly if the average cost is to allow for possible loss by submarines. So that there is a large deficiency on this special account of food supply service, since we are still providing the public with wheat at a loss every day."

Government Monopoly of Cereals in Russia.—Consequent on the decree as to monopoly of the cereals, the Provisional Government under date of May 13th, 1917 (old style) has issued regulations dealing with the requisition of wheat, rye, barley, oats, maize and their products. The Government officials are to requisition all stocks excepting what is necessary for the sustenance of the holders.

Encouragement of Production in Italy.—In order to facilitate the operation of loans intended to encourage production of cereals, vegetables and root crops, a decree of the Lieutenant General of the kingdom, published in the *Gazzetta ufficiale* on June 30th, 1917, enacts that loans of an aggregate maximum of \$4,000,000 may be granted to agricultural credit associations. The interest to be paid by these associations is fixed at 3%. Decrees of the Ministers of Agriculture and Finance acting in concert will determine in each case the amount of the loans to be allotted to individual agricultural associations.

Condition of the Crops in the Ottoman Empire.—The *Frankfurter Zeitung* published on June 9th, 1917, the following information as to the condition of crops in the Ottoman empire under the heading of "information from the special department of the Ministry of Agriculture":—

Advices received from all parts of the Ottoman Empire encourage the belief that, consequent on the efforts of the agricultural authorities, the area as a whole exceeds expectations, and reaches more than two-thirds of the normal.

Owing to favourable spring rains the harvest promises to be very good, and, unless something unforeseen occurs, the yield will be equal to the best pre-war harvest, more particularly to that of 1910. In order to remedy the scarcity of labour, agricultural machines were imported from Switzerland, Sweden and Norway. During May there was serious danger from invasion by locusts, but this passed away with their destruction.

Prices for Seed Wheat in Britain.—The food production department of the Board of Agriculture and Fisheries notifies that, in view of the necessity of providing seed wheat for early spring sowing next season, the Department is prepared to buy seed wheat of the 1916 crop threshed after June 1st, 1917, and until further notice to offer such wheat a premium above the maximum price for milling wheat.

(Crop 1917).—The Department also proposes to acquire pure stocks of certain of the less plentiful varieties of winter-sown wheat from the crop of 1917. Crops in adequate quantity found after inspection to be suitable for seed will be purchased at a substantial premium above the milling price.

Regulations in Austria.—According to the *Pester Lloyd* of Budapest, June 22nd, 1917, the Official Gazette of that date publishes a decree relating to the seizure and requisition of cereals of the crop of 1917.

A maximum allowance of 33 lb per head per month is to be made to all male agricultural workers of over fifteen years of age. This allowance is to include wheat, rye, meteil and barley taken in their aggregate.

The maximum for other workers and members of their families will be 26½ lb.

Non producers are prohibited from purchasing more than 26½ lb. per month. Administrative bodies must not supply more than 15½ lb. of flour per head per month to persons under their control. The people's food department will define the quantities to be allotted to workers under strenuous conditions.

The *Landwirthschaftliche Zeitung* of Vienna, June 13th, 1917, publishes an order dated May 26th, 1917, of the council of ministers, respecting the arrangements for threshing incumbent on the owners of cereals. The authorities may fix a period for this operation, and on its expiry may proceed with the threshing at the cost and risk of the owner. In case of need they are empowered to act without any such delay reimbursement of the usual charges to be made.

The *Wochenschrift des Zentralvereins für die Rubenzucker-Industrie* (sugar beet industry) of Vienna, June 6th, 1917, inserts the text of a ministerial decree of May 26th, 1917, prescribing the seizure for benefit of the state of home-grown cereals

and vegetable produce at the beginning of the harvest. Contracts for sale of any such products are prohibited, and sales already made will be considered as null and void. The growers may retain the quantity requisite for food and seed.

Regulations in Germany.—The *Reichsanzeiger* (official) of May 21st, 1917, announces that a premium of \$23.80 at par per 2200 lb., in addition to the requisition price, will be granted to growers who had carried out their obligations to deliver their oats, but who, nevertheless, make delivery before July 15th, 1917, of the remainder of such quantity as they have been permitted to retain.

The *Berliner Tageblatt* of June 4th, 1917, announces that the Federal Council has made, under date of June 2nd, a decree offering premiums in compensation of increased outlay resulting from early threshing, such premiums to be in addition to the maximum price.

The *Reichsanzeiger* (official) of May 19th, 1917, publishes a decision of the war food supply department reducing the ration of oats for the "zivillpferde" (horses not in army service) to 3.3 lb. per day.

THE WORLD'S WHEAT PROSPECTS FOR THE GRAIN YEAR 1917-1918.

BY T. K. DOHERTY

WITH the opening of the new grain year, on August 1st, the question of the world's supplies and demand has become a matter of anxious consideration among wheat producers and consumers. It is the purpose of this brief survey of the situation to make a rough forecast of the prospects with such scanty material, whether official or not, as has so far reached this office.

First is presented a statement of the world's production for the years 1916 and 1917, together—for comparative purposes—with the average production for the five-year period preceding the war. The figures for the five-year average are, with a very few and insignificant exceptions, official figures. Those for 1916 are, for the countries outside of Central Europe, also practically all official, the sources having already been indicated in the June

number of the GAZETTE, page 536. The notes appended to the table will explain as far as possible the reasons for departing from previously estimated average data when official information has not been obtainable. In the case of Argentina and Australia, whose harvests only begin in December, it will be understood that we are somewhat influenced by the optimists in these countries who have up to this time sent to Mr. George Broomhall glowing reports, based on favourable seeding conditions and excellent growing weather following that period.

Following the production table there is a rough presentation of the prospective import and export situation compared with the data of the previous year in so far as ascertainable, which no doubt will have to be changed as official figures become available.

WORLD'S PRODUCTION OF WHEAT.

Countries open to the world's commerce.

Countries.	1917	1916	Five years' average (1909-13)
	Bushels	Bushels	Bushels
United States (a).	653,000,000*	639,886,000	686,694,000
Canada (b)	250,000,000	220,867,000	197,118,000
Mexico	8,460,000	8,000,000	8,480,000
Argentina (c)	200,000,000	70,225,000	147,071,000
Uruguay	6,500,000	5,390,000	6,519,000
Denmark (d)	4,500,000	6,026,000	5,344,000
France	161,670,000*	214,624,000	317,639,000
Greece	4,000,000	8,000,000	4,320,000
Italy	147,000,000*	176,531,000	183,336,000
Netherlands	4,000,000	4,034,000	4,896,000
Norway (d)	250,000	305,000	306,000
Portugal	7,440,000	8,000,000	7,440,000
Cyprus and Malta	2,400,000	2,400,000	2,400,000
Spain	141,000,000*	152,330,000	130,447,000
Sweden (d)	5,000,000	7,775,000	7,769,000
Great Britain (e)	55,000,000	57,805,000	58,043,000
Ireland	4,347,000*	2,827,000	1,597,000
India	379,307,000*	318,005,000	359,035,000
Japan	26,533,000*	28,307,000	24,166,000
Algeria	30,000,000	29,152,000	34,998,000
Egypt	35,000,000	36,543,000	34,814,000
Tunis	8,000,000	11,023,000	6,230,000
Australia (f)	150,000,000	152,090,000	90,499,000
New Zealand	7,000,000	5,000,000	7,070,000
Chili	12,000,000	12,000,000	14,000,000
Switzerland	4,000,000	4,053,000	3,314,000
The Cape	2,400,000	2,400,000	2,400,000
Totals.	2,308,827,000	2,183,098,000	2,345,945,000

Countries not open to the world's commerce.

	Bushels.	Bushels.	Bushels
Austria (g)	36,500,000	48,672,000	60,840,000
Hungary	135,000,000	135,717,000	169,646,000
Belgium (g)	9,000,000	11,917,000	14,896,000
Bulgaria	34,000,000	33,951,000	42,440,000
Germany (g)	91,000,000	121,696,000	152,120,000
Poland (h)	39,000,000	52,000,000	65,000,000
Herzegovina and Bosnia (g)	1,500,000	2,048,000	2,560,000
Roumania	70,000,000	78,521,000	87,793,000
Russia-in-Europe (48 governments)	550,000,000	595,425,000	624,620,000
Russia-in-Asia	86,000,000	86,812,000	151,142,000
Persia	13,600,000	13,600,000	13,600,000
Serbia (g)	8,000,000	10,880,000	13,800,000
Totals.	1,073,600,000	1,191,239,000	1,398,457,000
World's Total.	3,382,427,000	3,374,337,000	3,744,402,000

NOTE.—The figures for 1917 marked by an asterisk are official, the other estimates for that year are mostly explained in the following notes:—

(a) Threshing returns show excellent quality and larger yields than anticipated at the time of this August 1st report. Especially is this the case in the winter wheat territory; so it is not unlikely that the forecast as of July 1st, indicating a total wheat crop of 678 million bushels, or even an estimate reaching the five-year average, will eventually prove to be nearer the reality.

(b) No official report has yet been published giving absolute figures. The above is a mere estimate based partly on the official percentage figures ascertained August 1st, partly on the improved conditions following that date. Samples from a large number of districts examined recently reveal exceptional

high-grading quality, and a yield from 10 to 30 bushels, in most instances much higher than expected two or three weeks earlier. The estimate in the table allows for a yield slightly over 19 bushels on an acreage of 13,000,000, and assumes that 550,000 of that sown will be abandoned or used as fodder.

(c) An official estimate at the beginning of August indicates the area seeded to wheat during the present season is 17,574,000 acres, compared with 16,082,000 last year, and owing to exceptionally favourable weather conditions, a possible production of 237,000,000 bushels. As the harvest will not take place before the latter part of December we prefer not to rely on this estimate: we have used in our table an estimate based on the area as now officially reported and the average yield per acre during the best single year of the pre-war period 1909-10-

1913-14, viz.: slightly in excess of 11 bushels per acre. The average during the whole five-year period is only 9.2.

(d) Mr. Broomhall has received persistent reports of damage through winter frost, together with spring and summer drought.

(e) The *Times* (London), August 14th, reported the condition of wheat August 1st as 88.6, compared with 85.8 the previous month and 90.75 the previous year. Rains, coupled with high winds, have lodged the grain in some sections, both delaying the harvest and injuring the crop.

(f) Weather conditions have so far been excellent for the new wheat sown on a reduced area, not yet officially reported. Harvesting begins in December.

(g) The central European enemy countries have not published any official report since the war. It is to be presumed that they have decreased their production about in the same proportion as that ascertained to exist in France, which has issued official estimates. In this table, in so far as these countries and those under their domination are concerned, there can only be shown a general approximation to the real situation. To arrive at their production for the last couple of years we have reduced their annual averages for the five-year period before the war to conform approximately with the decreased average of France as compared with the same five-year period. For 1916 20%, or considerably less than the French reduction has been made; for 1917 the reduction has been figured at 40%, which is slightly less than the reduction which has actually occurred in France. It is believed these reductions are fully justified, not only on account of the general similarity of conditions imposed by the war, but, particularly in 1917, the inclement conditions during the winter coupled during the winter and summer with exceptionally droughty conditions from which France has been practically free. Positive information has been ascertained in regard to the surrounding countries subject to the same climatic

conditions, namely, Sweden, Denmark, and Northwestern Russia, where the drought especially has had serious effects. It is admitted at Vienna that similar, if not worse, conditions have prevailed in Austria. Mr. Broomhall's correspondents grant for Hungary a crop probably but slightly under that reported for 1916.

(h) These figures refer to Russian Poland and the other Russian Provinces detached by the German invasion. This same territory produced before the war over two-thirds of Russia's total potato crop.

PROSPECTIVE REQUIREMENTS AND SUPPLIES

A general view of the world's production statement shows that the prospective production in 1917 will be a little over 8,000,000 bushels more than that of the preceding year, and about 362,000,000 bushels less than the pre-war average. We are, however, immediately concerned only with those countries which are accessible to the world's commerce. The European and Mediterranean countries, whether entente or neutral, more or less dependent for their supplies on the outside world are: Denmark, France, Greece, Italy, Netherlands, Norway, Portugal, Cyprus and Malta, Spain, Sweden, Great Britain, Ireland, Egypt, Tunis, Switzerland, Belgium.

Separating these countries from the preceding table, the total production of wheat in them we find was in 1917, 592,607,000 bushels compared with 704,193,000 in 1916 and compared with 782,791,000 in the pre-war average. There is therefore, a reduction of 101,586,000 bushels as compared with 1916 and a reduction of 190,184,000 as compared with the pre-war average.

For the leading countries among these we present as follows the imports as so far officially reported for the year 1916-17, the prospective imports for that whole year at the same rate of monthly shipment, and present, moreover, a tentative estimate of the quantities which these countries and the European countries as well might reasonably be expected to require for 1917-18 under all the circumstances ascertained to date:—

Countries.	Actually imported 1916-17		Imports at same rate for full year 1916-17.	Probably needed for 1917-18.
	No. of months.	Quantities imported.		
		Bushels.	Bushels.	Bushels.
United Kingdom ..	6	88,000,000	176,000,000	190,000,000
Italy	10	60,000,000	72,000,000	90,000,000
France	5	62,000,000	138,000,000	160,000,000
Holland	5	11,000,000	26,000,000	20,000,000
Belgium			24,000,000	24,000,000
Scandinavian countries ..				13,000,000
Spain and Portugal ..				8,000,000
Greece, Salonika and Serbia ..				20,000,000
Switzerland				15,000,000
Total European requirements				540,000,000
Requirements Ex-Europe				50,000,000
Total requirements				590,000,000

In view of the lessened production in Europe, whether the above estimates of certain countries are or are not exaggerated, the total does not seem large, and is probably much under the quantities which will have to be shipped from the exporting countries to eventually meet all the actual requirements. Fifty million bushels only are allowed to countries ex-Europe which

before the war actually imported on an average 98,000,000 bushels.

On the export side, leaving out of our estimate Russia, Algeria, Uruguay and Chili, whose shipments will probably be negligible, and bearing in mind for the moment only such quantities as shipping facilities will probably allow, we submit the following prospective exports:—

Countries.	Probable home supplies 1917 crop.	Actual Exports 1916-17	Prospective shipments 1917-18
	Bushels.	Bushels.	Bushels.
Canada ..	255,000,000	174,565,000	175,000,000
United States ..	680,000,000	189,123,000(a)	140,000,000
Argentina (new crop).	200,000,000	58,477,000	100,000,000
Australia (old and new crops)	306,000,000	74,995,000	100,000,000
India ...	379,000,000	42,527,000	60,000,000
	1,820,000,000	539,687,000	575,000,000

(a) Month of July estimated.

This total of 575,000,000 bushels is submitted merely tentatively. Mr. Broomhall reports that about August 1st the visible stocks of wheat in Australia were 87,000,000 bushels compared with 74,000,000 the year before, and that the combined stocks of the Federal Wheat Pool on that date were 156,184,000 bushels. The new crop to be harvested in December and January, and which could not in any event begin to reach Europe before February in view of shipping facilities, may practically be excluded from present consideration. It is problematical for what proportion of the 156,000,000 bushels of the old crop shipping facilities may be available. The same

remark applies to the new Argentina crop, concerning which there is at present such a fair prospect.

THE OTHER CEREALS

Official data concerning other cereals, so far very meagre, do not at present justify any detailed forecast. The conditions which make for good or bad wheat crops influence production of the other cereals, and the European shortage of wheat is likely to be accompanied to some extent by a corresponding shortage of rye and barley. These cereals, together with oats and Indian corn, will be dealt with in a later issue of THE AGRICULTURAL GAZETTE.

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DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR: J. B. SPENCER, B.S.A.

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Minister of Agriculture

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CONTENTS

	PAGE
The Live Stock Industry.....	847
Federal Agricultural Legislation.....	848
Federal Appropriations for Agriculture, 1917-18.....	850

PART I

DOMINION DEPARTMENT OF AGRICULTURE

Elevator Screenings for Poultry and Farm Animals.....	851
The Dominion Experimental Farms:—	
The Poultry Division:	
Game Fowl at the Experimental Farm, by F. C. Elford.....	853
The Entomological Branch:—	
The Natural Immunity or Resistance of Plants to Insect Attack, by R. C. Treherne.....	855
The Live Stock Branch:—	
Free Transportation of Breeding and Feeding Cattle and Sheep, by H. S. Arkell.	859
The Health of Animals Branch:—	
Cattle Mange (Psoroptic Scabies), by J. C. Hargrave ..	860

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Co-Operative Marketing of Wool:—	
Prince Edward Island, by W. J. Reid ...	863
Nova Scotia:	
Pictou County United Farmers Limited, by W. Tamplin.	864
Antigonish County Wool-Growers' Association, by Hugh McPherson. .	865
Guysboro County Wool-Growers' Association, by A. B. Macdonald .	865
Richmond County Wool Growers' Association, by Rev. R. L. McDonald.	865
Annapolis Valley Wool-Growers' Association, by J. L. Pineo ..	865
Inverness County Wool-Growers' Association, by John R. McDonald.	866
New Brunswick:	
Sussex and Studholm Wool-Growers' Association, by M. A. Macleod	866
Quebec, by H. Barton	866
Ontario:	
The Ontario Sheep-Breeders' Association, by R. W. Wade.....	868
Manitoulin Co-Operative Association, by Wm. Hilliard ..	868
South Manitoulin Wool-Growers' Association, by G. H. Bond .	868
Manitoba, by J. H. Evans.....	869
Saskatchewan, by W. W. Thomson ..	870
Southern Saskatchewan Wool-Growers' Association, by C. S. Herringer..	870
Alberta:	
The Alberta Sheep-Breeders' Association, by E. L. Richardson ...	871
Alberta Provincial Sheep-Breeders' Association, by W. J. Stark	871
Pinchers' Wool-Growers' Association, by J. W. Harwood...	872
The Lacombe Wool-Growers' Association, by A. J. Cameron.	872
Vermilion Wool-Growers' Association, by Job Mace.....	872
British Columbia:	
Interior of British Columbia Wool-Growers' Association, by C. E. Lawrence.....	872
At the Central Warehouse, Toronto	873
The Study of Veterinary Science:—	
Nova Scotia, by M. Cumming ..	874
Quebec, by F. T. Daubigny ..	875
Ontario, by J. H. Reed.....	876
The Ontario Veterinary College..	877
Manitoba, by C. D. McGilvray...	878
Saskatchewan, by W. J. Rutherford.....	880
Alberta, by H. A. Craig ..	881
The American Veterinary Medical Association.....	881

Quebec:—	
Macdonald College:	
Sales of Pure Bred Sheep.....	882
Ontario:—	
Pasteurization of Milk, by D. H. Jones	882
District Representative Features.....	883
Orchard Demonstration in Dundas County, by E. P. Bradt.	884
Saskatchewan:—	
Activities of the Provincial Department of Agriculture	885

PART III

RURAL SCIENCE

Summer Courses in Agriculture for Teachers:—	
Nova Scotia, by L. A. DeWolfe.....	887
New Brunswick, by R. P. Steeves.....	887
Macdonald College, by F. C. Harrison	888
Ontario Agricultural College, by J. B. Dandeno	890
Manitoba, by R. Fletcher	894
Saskatchewan, by A. W. Cocks	894
Alberta, by Jas. C. Miller.....	897
British Columbia, by J. W. Gibson	899
Rural School Consolidation:—	
Prince Edward Island, by Theodore Ross	901
Nova Scotia, by A. H. McKay	901
New Brunswick, by W. S. Carter	902
Alberta, by D. S. MacKenzie	902
Ontario:—	
Short Courses in Domestic Science	903
School Ground Improvement	904
Principal of School of Household Science Resigns.	906

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Elevator Screenings Available for Stock Feeding	907
Junior Farmers' Judging Competition	908
Agricultural Instruction at the Canadian National Exhibition	909
Relief for Belgian Poultry Raisers.....	910
Associations and Societies:—	
The United Grain Growers	910
Sale of Alberta Provincial Sheep and Swine Breeders' Association	910
The Entomological Society of Ontario	911
New Publications	911
Notes.....	912
Index to Periodical Literature.	913

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence.....	914
Science and Practice of Agriculture	914
Crops and Cultivation.....	915
Live Stock and Breeding	918
Farm Engineering.	921
Rural Economics.	922
Agricultural Industries	923
Plant Diseases.	927
Injurious Insects	927
Foreign Crop Conditions	928
International Year Book of Agricultural Statistics	929
Consumption of Cereals in Tropical Countries	930

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THE LIVE STOCK INDUSTRY

AT the stockmen's luncheon given by the directors of the Central Canada Exhibition on Friday, Sept. 14th, the Honourable Martin Burrell, Minister of Agriculture, seized the opportunity to, in some measure, review the present state of the live stock and poultry industry. After referring to the keen attention which had been paid to agriculture during the three years of the war, and acknowledging the co-operation which had been displayed by many civic and commercial bodies and other urban organizations in the efforts towards increased production, Mr. Burrell referred to the fact that there are now 28,000,000 cattle less in Europe than when the great conflict broke out. There were 54,000,000 sheep less and 32,000,000 swine less. The depletion would assuredly continue month by month while the war lasted. Necessarily, then, there must be for years a strong demand from this continent for live stock and live stock products. In the United States there were 63,000,000 head of cattle, an increase over last year; 21,000,000 horses, 48,000,000 sheep—both much the same as last year; and 67,000,000 swine, the last-mentioned indicating a decrease of about 300,000. A rough approximation of the figures in Canada would show 6,000,000 cattle, 3,000,000 horses, 2,000,000 sheep, and 2,500,000 swine. Here, as in the United States, swine showed a decrease of about 300,000.

Turning to live stock products, Mr. Burrell pointed out that in the imports into Great Britain, Canada stood easily first in cheese. In bacon she was third, and in eggs she also was third. There had been a gratifying increase in the export of live stock products, the total value of which had reached the sum last year of \$109,247,000. A significant feature of this was the egg trade. For many years imports into Canada had exceeded exports, but in the last two years the exports had exceeded the imports by over six million dozen.

"I am aware," said Mr. Burrell, "that the whole question of production and high prices is linked up with the necessities of the consumer, but I cannot too much emphasize, even on behalf of the consumer, the great importance of developing a permanent export trade in these products if we are to avoid that continual and sharp fluctuation of prices which is as unsatisfactory to the producer as to the consumer."

Referring to the services which the Department was rendering in the development of the live stock industry, the Minister spoke of the organization of the egg trade, and the initial steps that had been taken to standardize eggs and stimulate production. People complained of the high price of meat stuffs, dairy products and eggs, but omitted to remember the equally high price of feed. The Department now had under consideration plans by which the screenings from the elevators of the West, thousands of tons of which were at present going to the United States, might be made available for feeding poultry and cattle in Canada.

In touching on the question of food control and legislation of a restrictive character, the Minister went briefly into the difficulties of dealing with these questions. There had been constant requests for legislation prohibiting the slaughter of calves. England had taken action of this kind, and had had to reverse it, largely because of the extra demand which it had made on the reserves of cereals and foods which could be used by man. Restrictive legislation of this kind would not only perpetuate bad types of animals, but in preventing slaughter would restrict the farmer's market and probably discourage breeding.

"We have thought it wise," said

Mr. Burrell, "to approach this question in another way. Last year we paid the expenses of any farmer or representative of a farmer, who would take a carload of stockers and feeders back to the farms from the Winnipeg stockyards, and from October, 1916, to May 31 of this year, we sent back in this way 18,000 head of stock to Western farms, which otherwise would have been slaughtered or exported to the United States. We have also made an arrangement with the banks of Canada by which prizes are offered at over 500 fairs to boys and girls who feed and care for calves and pigs for a certain period. Further than this, and recognizing the large amount of forage existing in Eastern Canada, we have completed an arrangement with the railways by which farmers will be able to bring carloads of breeding stock back from the stockyards of Toronto and Montreal to the farms freight free."

Mr. Burrell concluded by referring to the provisions of the Live Stock Act, adopted at the recent session of the Dominion Parliament, for the regulation of stockyards and for the standardization and regulations of live stock products, and appealed earnestly to those present, and through them to the live stock men of Canada, not only to increase production, but to practice thrift to the greatest possible extent.

FEDERAL AGRICULTURAL LEGISLATION

THERE were two Acts passed at the recent session of the Dominion Parliament that especially relate to agriculture and its affiliated interests. These were:

An Act respecting Live Stock, introduced by the Honourable Martin Burrell, Minister of Agriculture.

An Act to assist Returned Soldiers in settling upon the Land and to increase Agricultural Production, in-

troduced by the Honourable Wm. Jas. Roche, Minister of the Interior.

THE LIVE STOCK ACT.

The Act respecting Live Stock, which is to be cited as "The Live Stock and Live Stock Products Act," explains that in the Act, or any regulation made thereunder, "commission merchant" means any person or partnership engaged in buying or

selling live stock for a commission, that "inspector" is an officer appointed by the Minister of Agriculture, that "live stock" means neat cattle, sheep and swine, that "stock-yard" means any area of land used as a public market for purchasing and selling live stock, with the buildings and all the equipment used in connection therewith, and that "live stock products" means meat, poultry, eggs and wool. There must be a live stock exchange in connection with each stock-yard working under the Act, and every commission merchant doing business thereat must be a member unless in possession of a special license issued by the Minister. Nothing in the Act, however, or in any regulation made thereunder, takes away or limits the right of a farmer or drover to sell his live stock at a stock yard. The by-laws of such exchange must be approved by the Minister. Provision must be made in such by-laws for security from each commission merchant, a member of the Exchange, for the proper accounting of the proceeds of sales or purchases. Every stock-yard must be constructed and equipped in accordance with the regulations, and no stock-yard can be operated or used until it has been inspected and approved, and the Minister or inspector is to have the right of inspection at any and all times. The Minister can close any stock-yard not operated or maintained in conformity with the Act and the regulations thereunder, but thirty days must elapse after notice has been given to the owner or lessee or occupier or operator before such action can be taken. The provisions of the Act do not apply to any stock yard now in operation until the Minister has caused a written notice to be served on the owner, manager or other person in charge at the date when the yard is to come under the Act, and that date must be within three months of the service of the notice. The Minister has the power to decide whether any public market where

live stock is dealt in is a stock yard to be governed by the provisions of the Act. The Governor-General in Council may make regulations prescribing:—

- (a) The manner in which stock-yards are to be constructed, equipped, maintained and operated;
- (b) The manner in which complaints against commission merchants and the operation, maintenance or management of stock yards shall be made or investigated;
- (c) The manner in which live stock, meat, poultry, eggs and wool shall be graded and branded or marked, and what shall be the size of packages containing meat, eggs and poultry, the kind of package that may be used, and how such packages shall be branded, marked or labelled.

Any person violating any provision of the Act, or any regulation, is subject to a fine not exceeding one hundred dollars, or to imprisonment for a term not exceeding three months or to both. Any person assaulting, obstructing or interfering with an officer in the performance of his duty under the Act is liable to a fine not exceeding fifty dollars or to imprisonment for a term not exceeding one month, or to both.

THE SOLDIERS' SETTLEMENT ACT.

The Act to assist Returned Soldiers in settling upon the Land and to increase Agricultural Production, to be cited as "The Soldiers' Settlement Act, 1917," after explaining in the preamble that "settler" means any person who has served in the naval or military expeditionary forces of Canada during the present war, or who was engaged in active service during the present war in the naval or military forces of the United Kingdom or of any of the self-governing British Dominions or Colonies, or who, being a British subject resident in Canada before the war, has been engaged in active service at one of the seats of war in either the naval or military forces of any of His Majesty's allies in the present war, and who has left the

forces with an honourable record, or who has been honourably discharged, and the widow of any such person who died on active service, provides for the appointment of three Commissioners to be known as "The Soldier Settlement Board," one of whom will be nominated as chairman, and each of whom must retire on reaching the age of seventy years. The Minister—that is, of the Interior—is authorized to reserve Dominion lands for the purposes of the Act, any such reservation to lapse three years after the close of the war. Any settler endorsed by the Board can be granted free entry for not more than 160 acres of such reserved lands. The Board can loan to a settler an amount not exceeding \$2,500 for acquiring land for agricultural purposes, the payment of incumbrances and for improvements on such lands, for the erection of farm buildings and the purchase of stock, machinery and equipment, or other purposes approved by the Board. Money thus

loaned is to be expended under the supervision of the Board, and the Board is to be satisfied that conditions justify the loan. Intending borrowers must make application in writing, giving all the particulars required by the Board. Loans are to bear 5 per cent interest and are to constitute a first charge upon the land. The Board can make provision for placing returned soldiers with farmers for instruction, for agricultural training of such soldiers, for farm instructors and inspectors to assist settlers with information and instruction, and for the training in domestic and household science settlers' wives and female dependents. The Board, with the approval of the Governor-in-Council, can make such regulations as are required, such regulations to be published in *The Canada Gazette*, and to be submitted to Parliament within fifteen days of the making thereof, and, if Parliament is not in session, within fifteen days after the opening of the next session.

FEDERAL APPROPRIATIONS FOR AGRICULTURE, 1917-18

Following are the allotments made at the recent session of Parliament for agricultural purposes for the financial year 1917-18. The Appropriations under the Agricultural Instruction Act were published in THE AGRICULTURAL GAZETTE for September.

Experimental Farms—Maintenance of Central Farm, and establishment and maintaining of additional branch stations.	890,000 00
Branch of Entomology.	20,000 00
For the administration and enforcement of the Destructive Insect and Pest Act.	85,000 00
For the development of the dairying industries, and the improvement in transportation, sale and trade in food and other agricultural products.	155,000 00
Fruit Branch.	105,000 00
Towards the encouragement of cold storage warehouses for the better preservation and handling of perishable food products.	50,000 00
Exhibitions.	50,000 00
For renewing and improving Canadian exhibit at Imperial Institute, London, and assisting in the maintenance thereof.	5,000 00
Health of Animals	517,000 00
Dominion Cattle quarantine buildings—repairs, renewals, etc.	10,000 00
For the administration and enforcement of the Meat and Canned Foods Act	325,000 00
Publications Branch.	30,000 00
International Institute of Agriculture to assist in maintenance thereof and to provide for representation thereat.	15,000 00
For the development of the Live Stock Industry.	700,000 00
To enforce the Seed Act, to test seeds for farmers and seed merchants, to encourage the production and use of superior seeds, and to encourage the production of farm and garden crops.	150,000 00
For the administration and carrying out of the provisions of THE AGRICULTURAL INSTRUCTION ACT.	25,000 00
For the eradication or control of the white pine blister rust.	25,000 00
For the purchase of seed grain—Governor General's warrant	500,000 00
	\$3,657,000 00

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

DOMINION DEPARTMENT OF AGRICULTURE

ELEVATOR SCREENINGS FOR POULTRY AND FARM ANIMALS

THE scarcity and high price of coarse grains for the feeding of live stock and poultry have led the Department of Agriculture, in the Experimental Farms and Live Stock Branch, to give special attention to the value and use of elevator screenings for feeding purposes. At the Experimental Farms this food has been fed experimentally to poultry and to farm animals. An analysis has also been made by the Dominion Chemist. The work of the Live Stock Branch has been in the direction of distribution. Several car loads of screenings have been moved from the terminal elevators at the head of the Great Lakes to central points in the Maritime provinces, where they have been made available to purchasers for feeding purposes.

EXPERIMENTAL FEEDING

The screenings used by the Experimental Farms for feeding tests were procured at the Fort William terminal elevator and distributed to the Central Farm and some of the eastern branch farms and stations.

The screenings were fed, under the direction of Mr. F. C. Elford, Poultry Husbandman, to all classes of poultry, old and young, the grain

in hoppers and the mash in hoppers or in moist mash. The birds after eating a corn and wheat diet did not take to the whole screenings for several feeds, but the mash was readily taken from the start. When the grain was fed in large quantities, the wheat was picked out, and a little care had to be taken in order to have them eat everything up clean. At the end of three weeks' feeding, everything was eaten up except a few oat hulls.

The feed as delivered has not proven satisfactory as a scratch feed, though samples have been received where the wheat is separated from the buckwheat. In this case the wheat makes fairly satisfactory feed for litter, and the buckwheat ground is an ideal mash.

A test was made on 200 pullets from 2 to 4 months of age. In twenty days they ate 516 pounds of grain and 204.5 pounds of mash. The total gain was 152.6 pounds that is, it took 4.7 pounds of the feed to make one pound of gain at a cost of 8.2 cents.

FOR SWINE FEEDING

E. S. Archibald, Dominion Animal Husbandman, reports that buckwheat screenings as a feed for swine of

all ages are very valuable. For finishing and young growing hogs, well ground buckwheat screenings will produce as great grains as a mixture of wheat, shorts three parts, fine ground corn three parts, linseed oil meal one part. This latter mixture at present prices is worth fifty-four dollars per ton on eastern markets, whereas screenings cost

about \$35.00 per ton.

THE CHEMICAL ANALYSIS

Dr. F. T. Shutt, Dominion Chemist, made an examination of this product and reports as follows:—

Our work on these samples is not completed, but the following will be of interest in indicating the general nature and feeding value of these screenings:

LAB. NO. 30781. BUCKWHEAT SCREENINGS, UNGROUND.

An examination of this sample gave the following results:

COMPOSITION BY WEIGHT.		per cent
Small, broken and shrivelled wheat		49.63
Wild buckwheat (unhulled)		36.08
" " (hulled)		4.54
Flax seed		.99
Oats		2.56
Wild Mustard seed		.07
Other weed seed		.41
Chaff, oat hulls, fragment of straw, etc		5.72
		100.00

This product it will be seen, consists approximately of 50% wheat, 40% wild buckwheat, (6% of which is hulled), 2.5% light oats, 1% flax seed and 6.5% weed seeds, chaff, etc., which may be classed as refuse.

The average composition of wheat and wild buckwheat may be given as follows:

	Wheat.	Wild buckwheat.
Water...	10.2	7.48
Protein	12.4	10.16
Fat	2.1	2.89
Carbohydrates	71.2	70.00
Fibre	2.2	7.29
Ash	1.9	2.18
	100.0	100.00

Comparing these two grains, the wild buckwheat seed contains approximately four-fifths the protein of wheat, is slightly richer in fat and has a much higher fibre content. In carbohydrates, the two are practically equal.

From analyses and study of wild buckwheat made in these laboratories in 1906, we concluded that this grain while not highly nitrogenous or oily seed, it is of fair feeding value and may be considered of special value for feeding poultry by reason of its comparatively low fibre content. Theoretically, wild buckwheat seed may be said to possess about 75% the value of wheat for feeding purposes.

The chemical analysis of this sample No.

30781, is not complete, and the results will be reported later.

LABORATORY NO. 30782. GROUND BUCKWHEAT SCREENINGS

The analysis of this sample has furnished the following data:

	per cent
Water	14.07
Protein	11.84
Fat	2.07
Carbohydrates	64.53
Fibre	5.36
Ash	2.13
	100.00

These results agree very fairly well with those which would be obtained from a mixture similar to the whole buckwheat screenings No. 30781 and we may, therefore, presume that this ground sample had before grinding essentially the same general composition as No. 30781.

It has a feeding value intermediate between wheat and wild buckwheat. From its composition it should prove an acceptable and valuable poultry feed, with only a small percentage of waste. It is sufficiently high in protein for general grain feeding, with a fat content not exceeding that of wheat—which may be considered an advantage for laying stock, that ration of which is usually enriched by crushed green bone or meal. The comparatively low percentage of fibre is a feature that enhances its value for poultry feeding, as this class of live stock cannot advantageously make use of high fibre feeds.

THE POULTRY DIVISION

GAME FOWL AT THE EXPERIMENTAL FARM

BY F. C. ELFORD, DOMINION POULTRYMAN

THE growing importance of game fowl as a national asset is being recognized by the Federal Department of Agriculture, and specimens of game birds and wild water fowl are being added to the Poultry Division of the Central Experimental Farm.

has been decided to add this feature to the Poultry Division.

Among the varieties that may be obtained are, of Waterfowl—Wild geese: Canadian, Snow, White fronted and Brant. Wild ducks—Mallard, Black, Canvas Back, Wood, Teal, Pintail, etc.



AN IDEAL FEEDING GROUND FOR WATERFOWL

As a rule the breeding stock obtain all their food during the summer months

The number of game birds are rapidly decreasing in Canada, although there are few countries better adapted to their breeding and rearing. Canada has plenty of shelter, an abundance of suitable feed and a good climate for most varieties. It also has an increasing demand for game as food.

Because of these facts and the desire to bring the matter more prominently to the attention of Canadians and incidentally to give those who visit the Experimental Farm an opportunity to see specimens of Canadian game and to learn more of their history and value, it

The game birds will include partridge, prairie chicken, grouse, quail and several varieties of pheasants—Ring-necked, English, Reeves, Golden and Silver.

Possibly White and Black swan may be added later.

The full stock will not be in this fall, in fact, it may take several years to procure suitable specimens of most that are desired. In all probability the list will never be complete as varieties may be added any time.

At the present time, September 1st, there are already secured two varieties of wild ducks, Mallard and

Black; one of wild geese, the Canadian; three of Pheasants, ring-neck, silver and golden. Several more varieties of ducks and one of geese will be added before winter, and most of the prairie and British Columbia game birds will be secured this fall from the Western farms.

The game birds will be kept in covered runs at the upper plant, and if these runs are too open for breed-

ducks when flying past, frequently alight for a rest and feed. Almost any time when the water is open, wild ducks can be seen on the ponds, and during the spring and fall the Canadian wild geese are frequently found feeding there. The yards are not covered, but the domesticated wild fowl are pinioned or have one wing cut, so they cannot fly away.

Canadian wild geese have been on



WILD GEESE AT THE EXPERIMENTAL FARM

Of the six Canadian wild geese shown, two were purchased two years ago; the other four are goslings hatched on the plant one year ago

ing, more secluded runs will be provided at the waterfowl plant, where the wild waterfowl will be yarded. This location is ideal; it has, as the illustration shows, excellent feeding grounds. In the ponds among the bulrushes, there is an abundance of feed and lots of cover. This place has already proven its adaptability for this purpose. Wild geese and

the plant for several years and good success in breeding has been obtained. The wild Mallard duck has also been here for a year or two. This year a pair have a nice brood that are growing fine and are quite tame. The black ducks and the pheasants were procured this year and have not as yet bred.

THE ENTOMOLOGICAL BRANCH

THE NATURAL IMMUNITY OR RESISTANCE OF PLANTS TO INSECT ATTACK

BY R. C. TREHERNE, FIELD OFFICER, ENTOMOLOGICAL BRANCH, DOMINION DEPARTMENT OF AGRICULTURE

AMONG the various natural means of controlling injurious insects of economic importance, in the field and orchard, that method which incorporates the essential features of a certain degree of "varietal immunity" or "varietal resistance" may be included. Conditions of immunity or resistance may be applied to certain species of plants or hosts, or certain individuals within a species, which possess a peculiar degree of resistance, complete or partial, as the case may be, which enables them to withstand attack better than others.

Plants display readily many numerous and excellent examples of varietal resistance to fungous and bacterial attack, but the same conditions are not so easily apparent in the case of insect injury. By way of a preface and to show the analogous position held by plants in their resistance to fungous or bacterial diseases, it will be only necessary to mention a few examples which have come under observation during the past few years.

In the coast districts of British Columbia, the most serious fungous disease attacking cultivated apples is that known as the apple-tree anthracnose (*Neofabraea malicortensis*). In sections where this disease is rampant such varieties of apples as the Duchess and the Transparent appear especially susceptible and succumb readily unless proper steps are taken to check the disease. On the other hand, in neglected orchards, it has been observed that the King and the Grimes Golden varieties, while not being immune, are more

resistant and frequently bear satisfactory crops of fruit. Apple scab (*Venturia inaequalis*), likewise, thrives freely on the McIntosh Red and Snow varieties, other varieties being relatively less subject to injury. In the irrigated sections of the dry interior, the bacterial disease fire blight (*Bacillus amylovorus*) is especially destructive to Spitzenburgs, Wagners and Crab apples, while in certain orchard sections where the disease has caused considerable concern such varieties of apples as the Duchess, McIntosh Red and Delicious have been observed to suffer only slightly.

It must be appreciated that, unless the fundamental reasons underlying these phenomena of resistance or susceptibility are more fully understood, the degree of resistance may vary according to different conditions of soil, climate and cultivation. Hence, it is only possible to state what has been observed in general orchard sections under as nearly uniform conditions as possible. Sufficient study, however, has been given the subject to indicate clearly that within a given territory there undoubtedly exist certain varieties of fruits, grains, and roots, which year after year, under normal conditions, remain resistant or susceptible to the ordinary fungous and bacterial diseases present within that territory. Further, it has been observed that certain individuals within a single variety withstand fungus attack better than others of the same variety. This feature was especially noticeable in an apple orchard affected with anthracnose (*N. malicortensis*), ob-

served a few years ago in the Lower Fraser Valley. The explanation of such an occurrence rests essentially on the supposition that all individuals vary among themselves, even though slightly, and that the variation may take the form of resistance to disease.

It is not advisable to enlarge on this phase of the subject any further. It is an accepted fact, recorded by many workers, who have given lists of crops, which have shown decided powers of resistance to disease, in their own particular localities, that such conditions do exist and cannot be ignored.

Our endeavour, more particularly, in this article, is to show that to some extent the same conditions apply to plants which show a disposition to ward off or repel attacks by insects. Undoubtedly the issue is complicated by the presence of many factors which obviously have little to do with any inherent plant character of a resistant nature. Such factors will necessarily have to be dispensed with before one can appreciate any special attribute of the plant itself which may enable it to withstand insect attack.

SOIL CONDITIONS

Horticulturists and agriculturists in general recognize the essential feature that strong plant growth is associated with good soil conditions. Any lessening in the quality of the soil conditions reacts in due proportion upon the growth of the plant. Further, those plants subjected to injury by either insects or plant diseases vary, very largely, in their ability to withstand attack, in as much as it is conceded that vigour lessens injury. On the other hand, it has been shown that with certain insects,—among which may be mentioned certain scale insects and plant lice—insects which possess a rapid form of multiplication and which are dependent on succulent forms of plant growth for their own develop-

ment, the reproductive capacity of individuals may be increased on strong growing plants. Hence it is advisable to draw a distinction between an abnormal and a normal growth, because it would appear that an abnormal growth is equally subject to severe injury as one weakened by some adverse soil condition.

Another consideration, bears on the relation of soil to the insects which make use of that soil to further their existence. Such insects as the plum curculio (*C. nenuphar*), the rose chafer (*M. subspinosus*) and the grape root worms (*A. obscurus* and *F. viticida*) prefer sandy and gravelly land to heavy clay soil, as suitable habitats. In such light land many insects, such as the above, breed more freely and crops grown on such land not only suffer more directly as a result, but depredations are usually first apparent under these conditions. Doubtless the plants themselves, in the first case, are less resistant to the attack by reason of being situated on light land or on land which is not well adapted to secure the best form of growth, but in the latter case the influence of the soil bears directly on the development of the insect.

EARLY MATURITY

Further, the question as to whether crops of certain varieties are injured by insect attack more than other varieties, may be answered by reference to the stages of maturity of the plant in association with the life history of the insect. In the Lower Fraser Valley of British Columbia spring wheat, in certain localities, is being severely troubled by the depredations of the wheat midge (*Diplosis tritici*). Fall wheat is seldom attacked. Early and late seedings of spring wheat are correspondingly less seriously attacked than mid-season plantings, for the reason that the midge, which possesses a minute delicate ovipositor, requires the wheat plant to be in a certain stage of flowering before eggs can be deposited

between the glumes to the best advantage. The pear thrips (*Taeniothrips inconsequens*), recorded from Vancouver Island, B.C., also represents a type of an insect wherein the relative dates of the bursting of the buds and the appearance of adult thrips in the spring, proportion the degrees of injury accorded different varieties of fruit. Thus early pears and apples suffer very much more severely from the feeding activities of the adults than later varieties of the same, and more than cherries and prunes.

In the same way, in New York State*, the grape blossom midge (*Contarinia johnsoni*) has done considerable damage to vineyards especially in the earlier varieties of the grape. "Concord grapes are seldom so badly infested as the earlier varieties, such as Moore's Early, Worden, Champion and Massasoit."

LOCATION AND CLIMATE.

Attacks by insects may, again, be influenced by climate and location. In the coast sections of British Columbia, the codling moth (*Cydia pomonella*) presents a different problem to that in the dry sections of the interior. The cold backward spring usually experienced on the immediate Pacific coast and the consequent long period of bud development, delays the appearance of the adult moth to such an extent that we have found a very low percentage of calyx entries with the first brood in the fruit. In the arid interior one would expect a much higher percentage of calyx entries owing to more even and higher temperatures in the spring. The problem of control and the question of varietal attack thus may vary.

During the past season in the Okanagan Valley, B.C., the season has been exceptionally hot and dry, especially during the latter part of

July and in August. As a result the growth of crops of onions have been influenced in proportion to each variety's ability to withstand heat and drought. The attacks of the onion thrips (*Thrips tabaci*) has also been experienced, and the presence of the insect is more readily observed in those varieties suffering from the influence of climate. The "red spider" of the apple (*Bryobia pratensis*) is also favoured in its development by conditions of drought and those trees are affected first which suffer from lack of moisture. And so it may be found that crops growing on different slopes, subjected to variations in wind, dew and amount of sunshine, may possess factors of resistance due mainly to the effects of location. Again it may be shown that varieties of crops growing near woods or waste land frequently suffer severely from specific troubles, which are harboured by such land. Such insects as *Syneta albida*, *Cercopeus artemiseae*, *Mimetus setulosus*, various click beetles, *Otiorynchus ovatus* and many others may be mentioned.

OTHER FACTORS.

Together with the foregoing, there are numerous factors influencing the susceptibility of plants to insect injury which will take too much space to enumerate. The cultivation of the soil and the relative vegetative conditions induced upon the host plant by such cultivation, for instance, might be enlarged upon to indicate the lines of distinction which must be drawn to judge safely the true proportion between an inherent plant character of a resistant nature and only seeming resistance brought about by environmental conditions.

It remains now to mention a few examples of insect preference to certain and apparently specific plants. It must be regarded that if certain insects, especially those which attack an extended range of host plants,

*Hartzell, N.Y., Agr. Exp. Sta., Bull., 331.

show a certain repugnance towards any particular plant, some peculiar character must exist in that plant, a character which might be made use of by careful selection or breeding.

When one is met with such features as the comparative immunity of the Northern Spy and Majestic apple stocks to the attacks of the woolly aphis (*Eriosoma lanigera*); the dislike of the western forest tent caterpillar (*Malacosoma erosa*) for the pear tree; the relative resistance of the Le Conte and Kieffer pear stocks to the San Jose scale (*Aspidiotus perniciosus*); the distaste shown for black currants, lettuce, etc., by such an omnivorous insect as the cutworm *Peridroma saucia*; the apparent resistance of the red Dutch cabbages to the attacks of the cabbage root maggot (*Phorbia brassicae*) and the dislike of the corn plant by the alfalfa looper (*Phytometra californica*), all of which examples have been observed, one cannot help but wonder how far these phenomena carry and whether it would be possible to utilize such features in the practical realms of agriculture.

IMPORTED INSECTS.

In order to further exemplify the point towards which we are tending, brief references to the writings of well known authorities in the United States are advisable. Dr. Felt, in New York State, refers to the fact that the forest tent caterpillar (*M. diss-tria*) attacks sugar maple in preference to the soft maple, the latter being comparatively free from attack. He also records the fact that the spiny elm caterpillar (*Euanessa antiopa*) rather seriously injures American elms, while Scotch and English elms are not preferred. Similarly, the maple scale (*Pulvinaria innumerabilis*) rarely injures the sugar and Norway maples, but attacks especially the soft maples. Dr. Felt has further rated various shade trees in New York in their order of susceptibility or immunity from attack by insects.

The European elm sawfly (*Kalio-sysphinga ulmi*) attacks the English and Scotch elms, including the Camperdown variety, in preference to the American elms (Slingerland, Cornell). The elm leaf beetle (*Galerucella luteola*) is reported as most seriously infesting the European elm and when other species of elm were found growing nearby preference seemed to be shown for it. (Burgess, Illinois.) The European elm scale (*Gossyparia spuria*) attacks the American elms more seriously than the imported English elms. (Doten, Nevada.) The fruit tree bark-beetle (*Euzophera semifuneralis*) clearly prefers the European or imported varieties of plum, but does occur in the native kinds; *Prunus simoni* has, however, thus far been worst affected by it. (Sanderson, Delaware.) The white peach scale (*Diaspis pentagona*) a very polyphagous feeder, does not attack the Le Conte and Kieffer pears. (Gossard, Florida.) The apple maggot (*Rhagoletis pomonella*) is noted particularly in the sweet and sub-acid summer varieties, while fall and winter sorts, including acid varieties are less infested. (Quaintance, U.S. Bureau.) The brown mite (*Bryobia pratensis*) is seldom observed on quince or apricot, although it attacks a great variety of trees including almonds and peaches. (Weldon, Colorado.) The use of resistant vines against the grape phylloxera represents a good example of the value of selection. The wild vines of the Mississippi Valley states which have evolved in company with the *Phylloxera*, possess the more resistant forms. The European vine (*V. vinifera*) is the most susceptible of all in California. (Quayle, California.)

From all these instances, taken at random, it is impossible to deduce any special explanation which would account for such variations in attack and injury. It is clear, however, that plants do exhibit certain peculiarities which tend to reduce susceptibility or increase their resistance, but

if any progress is to be made in taking advantage of these peculiarities for the benefit of agriculture close investigation must be made into the the resisting power of individual plants in relation to their own injurious insects. That such is considered feasible is suggested in the more recent writings of insect habits on cultivated crops, where a series of paragraphs are often devoted to the subject of immune, susceptible, or resistant varieties. In some instances, it will be seen, that native plants are more susceptible to the attacks of imported insects, but in other cases the opposite is true. Consequently

we cannot arrive at any very definite conclusion, but from what has been said and written the following summary may be taken as a working hypothesis. That in general native plants are less susceptible than cultivated introduced plants to the attacks of native insects; that variations occur in all plants, and that these variations may take the form of a certain degree of resistance to insect attack; that highly cultivated plants and debilitated plants are more susceptible to insect injury, while a hardy, vigorous and thrifty growth is a necessary antecedent to degrees of resistance.

THE LIVE STOCK BRANCH

FREE TRANSPORTATION OF BREEDING AND FEEDING CATTLE AND SHEEP

BY H. S. ARKELL, M.A., B.S.A., ACTING LIVE STOCK COMMISSIONER

IN order to encourage the conservation of breeding cattle and sheep, and to facilitate the movement of feeding cattle and sheep from points where fodder is scarce to others where feed is plentiful, the Honourable Martin Burrell, Minister of Agriculture, has inaugurated a policy in connection with the railway companies whereby the transportation of these classes of animals will be facilitated.

FREE FREIGHT POLICY

The Canadian Railways have agreed to issue a special tariff in connection with the transportation of carloads of breeding cattle and of breeding sheep. Under this tariff, the railways will rebate 25% of the regular freight rate, while the Minister, on behalf of the Government, has agreed to pay the remaining 75%. The tariff will be applicable in both Eastern and Western Canada, but not between Eastern and Western Canada, in connection with the return of carloads of breeding stock from

the central stockyards to country points. The shipper will be required to make a declaration that he is a bona fide farmer, and that the stock so returned is for his own use or that of his neighbours, and is for breeding purposes only.

On presenting the certificate embodying this declaration and approved by the officer of the Live Stock Branch at the stock-yards, to the railway company, he will be entitled to the free shipment of the stock to its destination. The railway companies have agreed to forward such shipments prepaid, collecting from the Department direct that portion of the freight which the Minister has agreed to assume.

REBATE ON FEEDING STOCK

A special tariff has been issued by the Canadian railways, applicable in both Eastern and Western Canada but not between Eastern and Western Canada, which provides for a reduction of 25% of the usual freight tariff in connection with the ship-

ment of carloads of feeding stock from the central yards to country points. This important concession has been applicable in Western Canada for the past year, and was confirmed as to its application in Eastern Canada at the regular monthly meeting of the Eastern Canada Freight Association, held in Toronto on the 27th of September last.

REBATE ON CATTLE SHIPPED EAST

The most serious leakage through the exportation and slaughter of cattle is from the Winnipeg stock-yards. This is due to feed conditions in Western Canada, resulting in premature liquidation from several areas in the Prairie Provinces. In view of the fact that feed conditions in Eastern Canada are so satisfactory and the demand for feeding cattle so general, the Minister has agreed to pay 50% of the freight rate in connection with the shipment of carloads of feeding cattle from the Winnipeg stock-yards, consigned to country points in the Eastern Provinces. This concession will be applicable to both drovers and farmers alike. Shippers consigning to Eastern stock-yards, however, will not be entitled to the reduction.

FREE SHIPMENT OF SHEEP TO WESTERN CANADA

An arrangement has been effected between the Department and the Canadian railways as a result of which carloads of breeding sheep and lambs from the Toronto and Montreal stock-yards will be shipped to Western Canada, freight free. Persons desiring to secure sheep in Eastern Canada will also be entitled to receive the benefit of the free freight policy as noted above.

CAR LOT POLICY IN WESTERN CANADA

The Car Lot Policy which has been operating in Western Canada for the past year will be continued. Under its conditions, bona fide farmers or their agents desiring to obtain carloads of feeding and breeding cattle or sheep at the three Western stock-yards will be entitled to collect from the Department their reasonable personal and travelling expenses incurred in connection with the journey between their homes and the yards.

In order that full advantage may be taken of these concessions granted by the Department and the railways officers of the Dominion Live Stock Branch, stationed at the various stock-yards throughout Canada, are prepared to give every possible assistance to shippers.

THE HEALTH OF ANIMALS BRANCH

CATTLE MANGE (Psoroptic Scabies)

BY J. C. HARGRAVE, CHIEF INSPECTOR FOR ALBERTA

SCABIES in cattle, commonly called "cattle mange," a disease of great importance to the animal husbandman, is one of the oldest known, very contagious and very injurious. It will not occur spontaneously, as it is a contagious skin disease caused by a parasitic mite, and must be treated by external applications for the destruc-

tion of the parasite.

Despite the enormous financial losses, both from loss of conditions and death, it is a disease which yields readily to proper treatment. There are different varieties of the disease, but the most common form, the psoroptic, will be dealt with in this article.

NATURE OF THE DISEASE

It is a specific disease of the skin caused by that species of mites or acari known as *psoroptes communis bovis*, and, while parasites of this species cause scab in other animals, yet for each of these animals there appears to be a distinct variety of the parasite and the malady is not transmissible from one animal to another. The mites above mentioned can be seen by the unaided eye as very small specks, particularly if a quantity of the scab scraped from the skin of the animal is placed upon a sheet of black paper and kept in the sunlight for a few minutes, when they can be detected crawling around. The different stages of development of the mite takes place upon the animal body and they reproduce very rapidly. The young mite reach maturity in about eight days and in about four days more mate and lay their eggs, each female depositing in the neighbourhood of fifteen eggs, which hatch in from three to four days. These features in the cycle of their development will explain the necessity of a second treatment as referred to under the paragraph dealing with the treatment of the disease.

Reproducing as they do, say in fifteen days, one can readily see that in a very short time there would be sufficient descendants to infect a large number of animals, an evidence of the importance of treating thoroughly each and every animal of the herd.

From the foregoing it would appear that the period intervening between the time of the mites becoming established on the skin and the first symptom appearing would largely depend upon the number of mites at the time of infection.

HABIT AND EFFECT OF THE MITE

The mite in this disease, living as it does upon the surface of the skin, causes irritation and inflammation of the upper layers only, which is a

constant and characteristic evidence of the disease. It usually commences over the root of the tail and less frequently over the neck and withers. occasionally extending over the hips, shoulders, back and sides; in fact the entire animal body with the exception of the lower portion of the legs. There is a constant switching of the tail, scratching and rubbing, until often the blood flows from exposed parts. The irritation, which is due to the secretions of the mite, soon causes the formation of small elevations containing a rather thick fluid. These become very numerous and later become joined together, finally burst, allowing the contents to escape and form a crust over the skin, which process gradually extends to adjoining parts. If these crusts be removed the skin is found to be thickened, hard and dry and frequently cracked, or again thickened and covered with moisture, while on some parts of the body such as the neck, dewlaps and lower portion of the chest the skin may be in thick folds. Beneath the crusts the mites multiply. If the crusts be removed, the skin soon becomes dry and the parasites will leave that particular locality. In some cases the crusts, together with the gummy substance which is thrown out between the crusts, may accumulate to a depth of a quarter to half an inch.

THE TREATMENT ADVISED

Treatment consists of either thorough hand applications or the immersion of the animal in suitable dipping vats.

The first method is applicable in domesticated animals and may be used in range animals if the herd be not too large. To obtain the best results with the hand application the animal should first be clipped, all crusts removed by means of washing with soap and hot water, followed almost immediately by applying whatever remedy is being used. Various remedies have been

advocated, among them being creolin, tobacco, sulphur, petroleum and vegetable tar, etc. A mixture with vegetable tar as a foundation gives excellent results. The following preparation is that required when treatment is applied under the supervision of Health of Animals Branch officials:—

Sulphur.	2 pounds
Oil of Tar.	8 ounces
Raw Linseed Oil.	1 gallon

These should be gradually heated together but not boiled, as the sulphur and tar will cake in the bottom of the vessel. This dressing if thoroughly applied at a temperature of 110° to 120° will generally effect a cure, but should be washed off after a period of ten days and the application repeated.

Where the herd is too large to make use of hand dressings, or in the case of range stock, recourse should be had to the dipping vat, in which various mixtures are used, but, in the experience of the officers of the Health of Animals Branch, the following has given the best results:—

Flowers of Sulphur.	24 pounds
Fresh unslacked lime	10 pounds
Water.	100 gallons

PREPARATION OF THE MIXTURE

The preparation of this mixture is of the greatest importance. The lime should be carefully slacked and made into a paste. The sulphur being then added and thoroughly incorporated with the paste, the whole added to sufficient water—preferably boiling water—and thoroughly boiled for at least two hours, during which time it should be frequently stirred. The resultant mixture is then drained off and water added to make one hundred gallons. The vat is filled with the mixture in the above proportions and heated to 110° Fahrenheit, preferably 115°, in which the infected animals are held for two

minutes or longer, during which period all crusts or scabs should be loosened by means of a hoe or stiff brush. The animal must be again treated in this manner in not less than ten or more than fifteen days.

There are two varieties of dipping vats, the cage and swimming. From experiences gained by officers of the Health of Animals Branch it is found that the cage vat gives excellent results and is preferable to the swimming vat, although of necessity the latter must be made use of when stock in large numbers are dipped. In the case of the cage vat the animal is driven into the cage, which is then lowered into the vat by block and tackle, where it can be held the desired length of time.

INCEPTION OF THE DISEASE

Mange first made its appearance in the southern part of the province of Alberta about the year 1893, and in 1895 at the instigation of the Department two vats were erected. These, however, were found to have given indifferent results and it was not until 1904 that the Veterinary Director General adopted the policy of placing restrictions on some nineteen hundred townships in the southern part of Alberta and southwestern part of Saskatchewan and required that all animals within this area be dipped under the supervision of the officers of the Department. Continued progress followed the carrying out of the provisions of the Order, and at different times since the above date the restrictions have been removed from certain sections of the area, until at the present time there are approximately only some eleven hundred townships affected by the Order; and the condition within the area still remaining has improved to such an extent that it will be possible to again curtail the area at a very early date.

PART II

Provincial Departments of Agriculture

CO-OPERATIVE MARKETING OF WOOL

Invitations were sent to the various co-operative wool associations in Canada to forward a statement of their sales during the past season, for publication in THE AGRICULTURAL GAZETTE, and the replies herewith given were received. The information asked for was as follows:

1. The quantities of wool marketed co-operatively by your association, by classes, and the price per pound received for each class?
2. How the wool was marketed?—
 - (a) Central point or points of collection?
 - (b) How were buyers advised?
 - (c) By auction or personal agreement?
 - (d) Total expenses per pound of wool handled?
3. To what extent is co-operation in the sheep industry being applied by your association beyond the handling of wool?

PRINCE EDWARD ISLAND

BY W. J. REID, B.S.A., DIRECTOR OF AGRICULTURAL INSTRUCTION

THE third annual co-operative sale of wool, conducted under the Prince Edward Island Sheep Breeders' Association, has been concluded for this season with most gratifying results. Approximately 24,000 lb. of wool were graded at Summerside and Charlottetown and sold at an average price of 70.28 cents per pound. Such a result as this could only be obtained when the wool was handled by a co-operative method and graded according to quality. Owing to the general high prices paid for wool throughout this season, many of the sheep breeders were induced to sell their clip before the co-operative sale was under way. As a result they received from 5 to 15 cents per pound less than those who sold co-operatively and some cases were reported where the difference was

much larger.

The lectures and demonstrations given at short courses throughout the winter by Mr. J. D. Thompson of the Live Stock Branch, Ottawa, are responsible for establishing a regard for the proper care of wool, both as it concerns the care of the sheep and the preparation for market. The effect was noticeable in the shearing, tying and the higher grading of many individual lots that were previously handled at a disadvantage.

The community organization has been a prominent force in retaining and improving the co-operative work among the sheep breeders. The initial movement, which began in 1915, resulted in bringing many localities to recognize the value of concerted effort in the higher prices received for wool and lambs. From this beginning the work has de-

veloped until a majority of the prominent districts are using every means to better their flocks. The general care and feeding is receiving more attention; lambs are being attended to during the fall months with the object of satisfying the demands of the market, and new blood of the recognized utility breeds is being used more generally to improve the flocks of grade ewes; also the supply of pure-bred stock is

growing steadily each year, as breeders are coming to recognise the importance of the market for breeding animals as being one worthy of recognition. It can easily be conceived that such work is only in the stage of beginning and that the future prospects cannot be fully estimated.

The following is a statement of the wool handled:—

THE FOLLOWING IS A STATEMENT OF THE WOOL HANDLED:

Grade.	Lb.	Fleeces.	Av. Wt per fleece.	Price per lb.	% of Total.
Medium combing.	9255	1527	6.06	73c	37.93
Medium clothing.	1044	208	5.02	73	4.27
Low med. combing	7819½	1161	6.73	70¼	32.05
Coarse	1806	260	6.94	67¼	7.4
Lustre.	3735	484	7.71	67¼	15.01
Rejects.	454½	64	7.09	60	1.86
Grey and black.	122½	20	6.01	60	.5
Locks and Pieces.	108	....	....	56	.44
Tags.	150	....	....	50	.2

NOVA SCOTIA

PICTOU COUNTY UNITED FARMERS LIMITED

BY W. TAMPLIN, SECRETARY

OUR company marketed co-operatively 8,304½ pounds of wool this season, being made up as follows:—

Fleeces	Grade	Lb.
905	Medium coming.	5109
254	Medium clothing	1226½
178	Medium clothing	1156½
Total.		7492

and 812 pounds of coarse, rejects, gray and black, pieces and tags, for all of which we received an average of 70⅓ cents per pound. After deducting the cost of labour, insurance and other incidentals in the handling, we were enabled to pay to our members for the highest classes, 69½ cents per pound.

We notified our members who had sheep to deliver their wool at our warehouse at Westville, where it was graded, and buyers were advised through the Sheep and Goat Division of the Live Stock Branch of the Department of Agriculture. As a

result a number of bids were received from different parts of Canada, and the highest which was accepted was from a firm in this province. The total expense of handling did not exceed 1c per lb., including insurance.

We did not succeed this year in receiving as many fleeces as we had expected, owing to the activity of dealers inducing individual members to close bargains for cash before we were in a position to give any definite idea as to the amount we would be able to pay.

It was all new to us this year, but by next year, we have every reason to believe, that we shall have a much larger quantity. It has not been decided, as yet, what steps will be taken to insure substantial improvements in the industry before next season, but that something will be done as soon as possible, is certain, because the result of our beginning has exceeded our anticipation.

ANTIGONISH COUNTY WOOL GROWERS' ASSOCIATION

BY HUGH MACPHERSON, SECRETARY

OUR wool sold at a flat rate of 71½¢ per lb. for all grades. We graduated the prices paid members as follows:—

Grade of wool	lb.	per lb.
Medium combing	15,600	72½¢

Medium clothing. . . .	1,890	
Low medium combing. .	2,807	71c
Coarse.	418	70c
Lustre.	405	"
Rejects.	38	40c
Gray and black.	361	65c
Locks and pieces. . . .	250	"
Tags	29	50c

GUYSBORO COUNTY WOOL-GROWERS' ASSOCIATION

BY A. B. MACDONALD, SECRETARY

THE total number of pounds of wool marketed by this association was 1,462¾. The classes and prices were as follows:—

Grades of wool	lb.	per lb.
Med. combing.	1126¼	72½¢
Med. clothing	123	72½
Low med. combing . . .	90	71
Coarse.	10	70
Lustre.	22	70
Grey and black.	24	65
Locks and pieces	41	65
Tags.	3½	50
Rejects	23	40

The wool was collected in the town of Guysboro and then shipped to the town of Antigonish, being marketed with the Antigonish clip.

G. E. O'Brien, Maritime Representative for the Live Stock Department, Ottawa, advised the different buyers of the total number of pounds according to classes that was to be marketed at the different grading stations in the Maritime Provinces.

Sealed tenders were received for a period of two weeks.

The total expenses per pound on the wool handled was one cent.

Up to the present this association has not carried on co-operation in the sheep industry in any other line than the marketing of wool. However, we expect this fall to market the lambs of the different members of the Association.

RICHMOND COUNTY WOOL-GROWERS' ASSOCIATION

BY REV. R. L. MCDONALD, SECRETARY

THE wool sold this season by us was as follows:—

Grade	Fleeces	Lb.
Med. combing firsts. . .	209	969
Med. clothing firsts. . .	38	143¾
Low med. combing . . .	36	176½
Coarse.	8	44
Lustre	3	18½
Gray and black.	16	73

Locks and pieces	9½
Tags	3

Total	310	1,437¼
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Our central point is St. Peters. The expenses of handing were ½¢ per lb. As this is our first venture, co-operation has not yet extended beyond the marketing of wool.

ANNAPOLIS VALLEY WOOL-GROWERS' ASSOCIATION

BY J. L. PINEO, SECRETARY

OUR wool was sold by tender. This is our first year at it, so we were cautious as to expense and got off easily. The necessary building was donated and some of the labour other than the grading. It was just a try out and proved very satisfactory to all who put their wool in the experiment.

The price fetched was 71½¢. per lb.

Grade	Lb	per lb.
Medium combing.	1304	70 1/5c
Medium clothing	70	70 1/5
Low med. combing. . . .	439	67 1/5
Coarse and lustre.	291½	60
Black, gray and rejects .	119	50
Locks and pieces	44	35
Tags	18	22

Total.	2,285½
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INVERNESS COUNTY WOOL-GROWERS' ASSOCIATION

BY JOHN R. MCDONALD, SECRETARY

THE quantity of wool sold by us and the price commanded was as follows —

Grade	Lb.	per lb
Medium combing.	1965	70 1/5c
Low med. combing . . .	282	67 1/5
Med. clothing.	202 1/2	70 1/5
Black.	38	50
Coarse	29	60

The wool was collected at Port Hood, Inverness Co. Buyers were advised by circular letter. We asked for personal bids. The expenses were 1/2c a lb. Our business was confined to the wool alone, this being our initial year.

NEW BRUNSWICK

SUSSEX AND STUDHOLM WOOL-GROWERS' ASSOCIATION

BY M. A. MACLEOD, SECRETARY

THE co-operative marketing of wool by the Sussex and Studholm Wool Growers' Association amounted to the following:—

Grade	Lb.
Med. clothing	226.5
Med. combing.	2001
Fine medium.	661
Low medium.	673
Lustre.	212
Coarse	114.5
Rejects.	34
Grey and black.	19
Locks and pieces	83
Tags	34 5
	<hr/> 4,058 5

The best prices offered up to and including date of sale was a flat rate of 63 1/2 cents per pound for the entire lot.

Our central point is Sussex. We invited prices by mail as to quantities of the respective grades. Tenders closed on July 25th. The expenses

were carried by the Sussex and Studholm Agricultural Society and were not chargeable to the wool. They were:—Stewardship \$10, packing \$1.50, trucking \$1.50, total \$13.

The janitor of the building took charge of the wool as it arrived from day to day until it was finally shipped. The expense per pound was about 1/3 cent. Our members do not co-operate in any other branch of the sheep industry. We hope to be able to co-operate ere long in the sale of lambs.

Our legislators gave us a Sheep Protection Act at their last session that is workable and that will afford the industry a reasonable protection from such losses as were formerly incurred by the ravages of dogs.

The highest prices paid to wool growers in this vicinity who sold outside the organization was 60 cents per pound and as low as 40 cents early in the season.

QUEBEC

BY H. BARTON, B.S.A., PROFESSOR OF ANIMAL HUSBANDRY

THE wool grading and sales just completed in Quebec by ten associations have once more demonstrated the benefits of co-operation in the marketing of farm pro-

ducts. The average price obtained for the total output this year, including all grades, was just 11.57 cents higher than the average price last year, which was 41.7 cents a lb. The

first sales were made when 40 to 45 cents a pound was the ruling price in country districts.

In the matter of sale six of the associations in Quebec made a joint offering of 136,686 lb. at Lennoxville on May 26th. A large number of probable buyers were notified by letter of the date and place of sale and also of the grading dates and places, so that they might have an opportunity of inspecting the various grades of wool before making the bids at the sale. At this sale lots varying from 5,000 to 30,000 lb. were offered and, although one firm eventually secured the entire offering, there was nothing to hinder the smaller purchaser from securing the amounts desired. The remaining associations sold their offerings individually with hardly as good results as those who sold collectively. At the Lennoxville sale the following prices were received:—

Grade	per lb.
Med. clothing..	56 $\frac{1}{4}$ c
Med. combing	56 $\frac{1}{4}$
Low med. combing..	55 $\frac{1}{4}$
Coarse combing..	52 $\frac{3}{4}$
Black and grey.	43 $\frac{1}{4}$
Rejections..	43 $\frac{1}{4}$
Tags.....	5

Prices for the other associations ranged between the following figures:

Grade	Per lb.
Med. combing..	55 to 52 $\frac{1}{4}$ c
Low med. combing.	54 to 51c
Coarse combing	53 to 48 $\frac{1}{4}$ c
Rejects and black.	40 to 35c
Tub washed....	70 to 63c

With perhaps one or two exceptions the associations have shown considerable improvement in the preparation of their wool for market. One new association was organized during the winter and the other associations with one exception have increased their membership and the amount of wool marketed.

The following is a detailed statement of the grading for each association:—

STATEMENT OF WOOL GRADES

NAME OF ASSOCIATION	Medium Clothing	Medium Combing	Low Medium Combing	Coarse Combing	Black and Gray	Rejections	Tags	Miscellaneous	Total
Pontiac		21,230	17,362	5,916	362	761	266	(washed) 405	46,302
Richmond	162	2,615	8,418	19,827	335	3,634	57	damp. 119	35,048
Compton		11,389	11,984	9,137		2,013	44		34,686
Sherbrooke	75	11,442	6,117	1,438	196	754	231		20,253
Stanstead		8,411	8,461	1,374	101	1,373	131		19,851
District of Bedford	612	6,616 $\frac{1}{2}$	8,908	1,626 $\frac{1}{2}$	246 $\frac{1}{2}$	352 $\frac{1}{2}$	159		18,521
Argenteuil		1,400	6,278	5,299	349	1,365	26		14,717
District of Beauharnois		1,771	5,147	4,699		224	73		11,914
Megantic		232	2,967	4,903	121	104		(washed) 1,000	8,327
Ottawa		805	1,277	808		189			4,079
Totals	849	65,911 $\frac{1}{2}$	76,919	55,027 $\frac{1}{2}$	1,710 $\frac{1}{2}$	10,769 $\frac{1}{2}$	987	1,524	213,698
Percent of totals.	04	30.87	35.94	25.7	.82	.05	04	.75	

STATEMENT OF MEMBERSHIP, NUMBER OF FLEECES, AVERAGE WEIGHT AND PRICE PER FLEECE AND TOTAL VALUE OF WOOL MARKETED

NAME OF ASSOCIATION	Number of Members	Number of Fleeces	Average Weight Fleece	Average Price per Fleece	Total Value
Pontiac	348	6,166	7.5 lb.	3 80	23,441.07
Richmond	253	4,545	7 7	4 00	18,200 90
Compton	373	4,923	7.002 "	3 80	18,720 04
Sherbrooke	196	2,779	7 28	3.97	11,037 91
Stanstead	166	2,816	7 04	8 85	10,767.07
District of Bedford.	182	2,454	7.5 "	4 11	10,098.89
Argenteuil	130	1,980	7.4 "	3 74	7,410.82
District of Beauharnois	117	1,394	8.55 "	4 38	6,115 80
Megantic	94	986	8 44	4 51	4,453 41
Ottawa	17	372	8 2	4 40	1,636.17
Totals and averages	1,876	28,415	7 66 lb.	4.05	111,882 08

The expense of handling the wool co-operatively was from $\frac{1}{2}$ to 1 cent per pound. The fees charged by associations varied, some being 50 cents per member, with 3 cents per fleece additional, others 5 cents a fleece and others one cent per pound.

In addition to the marketing of wool, the wool-growers' associations are marketing lambs co-operatively and are doing something in the sale and exchange of pure-bred stock. The co-operative sale of market lambs seems to offer a specially wide field for development.

ONTARIO

THE ONTARIO SHEEP-BREEDERS' ASSOCIATION

BY R. W. WADE, SECRETARY

THE accompanying statement gives the amount of each grade of wool sold and the price received per pound. The wool was collected at the Winter Fair Building, Guelph, and graded by officials of the Dominion Live Stock Branch. Letters were sent to leading dealers giving them full information regarding the grading of wool at Guelph and inviting them to bid on the wool by tenders, the last date for receiving tenders being June 23rd. I would estimate the expense of handling the wool at Guelph at 1 cent a pound. The

Ontario Sheep Breeders' Association has not as yet entered into any other co-operative undertaking.

STATEMENT OF WOOL SALES

Grade	Price	Lb sold
Fine med. combing	67	3,259
Med. combing	66	82,795
Med. clothing..	67	6,735
Low med. combing	63 $\frac{1}{8}$	64,852
Coarse	57	93,756
Lustre	57	4,193
Rejects.	50	9,497
Gray and black.	46	1,430
Locks and pieces.	34	1,491
Tags..	26	5,120
Washed wool..	78	4,652

MANITOULIN CO-OPERATIVE ASSOCIATION

BY WM. HILLIARD, MANAGER, KAGAWONG

Our sales of wool have been as follows:—

Grade	Lb. sold	Price
Med. combing . .	6,300	56
Low med. combing	7,500	55
Lustre .	5,400	54

Coarse.	1,100	50
Gray, black, locks and pieces...	250	50
Rejections..	200	40
Tags.	260	12
Average flat price 55c.		

SOUTH MANITOULIN WOOL-GROWERS' ASSOCIATION

BY G. H. BOND, SECRETARY

The South Manitoulin Wool Growers' Association was organized on the 15th of February, 1917, on the fee system. Members having 15 fleeces or under, 25 cents; over 15, 50 cents. We have a membership of 110 with 2,000 fleeces. Owing to wet weather about 300 fleeces were not shown when the grading was done and had to be sold ungraded. The

wool was sold by tenders, about 12 firms competing. It was graded in three places and shipped from Providence Bay. The fees paid all expenses, every man got what his wool sold for. The Farmers' Clubs has been selling their wool and lambs for some years with good success.

We think co-operation on the Manitoulin Island has been a de-

cided success, no doubt due in part to the untiring work of our District Representative.

The quantity of wool handled and the price received were as follows:—

Grade	Lb.	Per lb.
Ungraded about.....	3,000	54
Med. combing, firsts	490	57

Med. combing, seconds..	50	57
Low med. combing....	2,277	56
Coarse.	3,804	51
Lustre.	7,689	56
Rejects.....	526	48
Gray and black. . . .	22	48
Locks and pieces	138	46
Tags	158	15
Total.....	18,154	
Average price, 54c.		

MANITOBA

BY J. H. EVANS, ACTING DEPUTY MINISTER OF AGRICULTURE

THE high prices obtainable for wool during the past season have impressed upon the mind of the sheep owner more than anything else the important place which the sheep occupies as a factor in developing successful mixed farming in the province of Manitoba. The sheep has been long recognized in older countries as the animal with the golden hoof. The initial expense incurred in establishing a flock is less in comparison than that expended in procuring a foundation for any other class of live stock.

The problem of finding a market for the wool prior to the advent of co-operative marketing was found somewhat difficult, and, while the co-operative system is not yet perfect, it is admittedly a great improvement on any other method employed heretofore for the disposal of the wool clip. This system was inaugurated in Manitoba in 1915, when 69,000 pounds of wool were disposed of under this plan. In 1916 the amount was increased to 160,000 pounds, approximately; whereas in 1917 the amount was still further increased to approximately 170,000 pounds. Roughly speaking the price of wool has increased 100 per cent during the past twelve months, the market having improved steadily throughout the past season. It is estimated that less than 50 per cent of the wool clip of the province was handled by the Department, the balance being sold ungraded to private concerns.

While it is naturally impossible to ascertain the prices realized in each case, the information to hand indicates that the balance of the wool not sold by the Department changed hands at approximately 40 cents a pound. While a few sales made during the latter part of July indicate that higher prices were paid than the above mentioned figure, a considerable portion of the clip was contracted for before shearing time, when the market would not justify the high prices which prevailed later.

Considerable improvement has taken place in Manitoba in the methods adopted in preparing the wool for market, but a great deal remains yet to be done in educating sheep-owners to the need for exercising more care in shearing and packing wool. The loss to the sheep-owner from selling tags and rejected wool, a great deal of which could be avoided, is considerable. The tying of fleeces with binder twine, the packing together of dirty and clean fleeces, white fleeces with black fleeces, etc., are other mistakes often recognized on receipt of the wool at the warehouse.

The practice followed this year is similar to that carried on in former years, namely: the wool is graded by a representative of the Sheep and Goats Division of the Live Stock Branch of the Dominion Department of Agriculture, whereas the balance of the work and the general management is carried on by the Manitoba Department of Agricul-

ture. Owing to the enhanced value of the wool, the consequent increase in insurance premiums, and also the general increase in all expenses in connection with the handling of the wool, it has been found that one cent a pound is barely sufficient to cover the cost of handling.

The method adopted in effecting a sale was to notify the commission houses and woollen mills throughout Canada and the larger wool warehouse centres of the United States, and call for closed tenders. Bids, however, were few in number.

There is no doubt that the constant rumours abroad that the Dominion Government, as well as the Federal Government of the United States, contemplated placing a maximum

price on wool, had its influence upon the smaller buyers. While local firms were anxious to be informed on the movements of the wool during the early part of the season, their interest ceased toward the latter part; they submitted no bids.

The following is a statement of the number of pounds received of each grade, and the prices paid:—

Grade	Lb.	Per lb.
Fine combing...	8,860	60c
Fine clothing.....	4,074	60
Fine med. combing. . .	12,330	65
Med. combing, firsts. . .	50,086	63
Med. clothing.	9,729	56
Coarse.....	69,198	57
Rejects.	6,796	45
Gray and black.....	2,351	48
Mohair.	193	60
Tags.....	4,531	20

Total..... 168,148

SASKATCHEWAN

BY W. W. THOMSON, DIRECTOR OF CO-OPERATIVE ORGANIZATION

AFTER having twice extended the date when shipments of wool would be received under the co-operative wool marketing plan, the Co-operative Organisations Branch got together a total of 225,000 pounds of wool. A total of 625 shipments were made by the farmers. This wool made up eight carloads, which were despatched to Philadelphia on July 31, where it was graded, stored, and then held for the best possible price. The total cost of freight, grading and handling will probably be about three cents a pound.

An advance payment of twenty cents per pound was paid to the

shippers, who were also being kept advised of quotations in Philadelphia, where at the time of writing the price ranged from 58 to 65 cents a pound.

Professor Tisdale of the College of Agriculture at Saskatoon, went to Philadelphia to look after the grading and storing of the wool. He takes careful notes of each individual shipment, and after the sale is made the original shippers will be communicated with and told just where their clip might be improved. This will give the wool grower a fund of valuable information for his future guidance.

SOUTHERN SASKATCHEWAN WOOL-GROWERS' ASSOCIATION

BY C. S. HERRINGER, MAPLE CREEK, SASK., SECRETARY

FOLLOWING is a statement of the wool sent by the Southern Saskatchewan Wool Growers Association to the central warehouse at Toronto conducted by the Live Stock Branch of the Federal Department of Agriculture:—

Fine medium staple.....	41,753
Fine clothing.....	12,176
Medium staple.	38,633
Fine staple.....	25,059

Medium clothing...	34,697
Low medium combing . . .	409
Rejects	5,748
Medium combing.....	2,994
Low staple.	1,262
Fine combing.....	33
Fine medium combing. . . .	821
Black.	466
Tag	513
Pulled wool.	635
Mohair	50
Ungraded wool.....	194
Total.	165,443

ALBERTA

THE ALBERTA SHEEP-BREEDERS' ASSOCIATION

BY E. L. RICHARDSON, SECRETARY

THE Alberta Sheep Breeders' Association, Calgary, sold, for its members on August 8th, 151,453 pounds of wool of various qualities for an average price of sixty cents per pound. The wool was collected at Calgary from 288 breeders, where it was classified by expert graders supplied by the Live Stock Branch of the Department of Agriculture for Canada.

Last year a considerably greater quantity was sold, namely, 280,000 pounds, which brought an average price of thirty cents per pound. The decrease in quantity this year is due to the fact that some of the large breeders, having been offered tempting bids from buyers, sold their stock independently of the association from two weeks to two months previous to the co-operative sale. The prices they received were from 35 cents to 50 cents per pound, the

average being about 45 cents. While these breeders received a considerably less price for their wool than if they had sold it through the association, the prices they obtained were undoubtedly better than if co-operative selling were not carried on.

The following is a statement of the quantities sold and prices received according to the classification of the wool:—

Grade	Lb.	Per lb.
Fine combing	15,630	59
Fine med. combing	49,940	64
Med. combing	41,516	62½
Low med. combing	9,596	59
Fine colthing	17,193	54
Med. clothing	7,922	59
Coarse	3,528	56
Rejects.	2,211	42
Mohair.	270	60
Karakule	435	50
Tags.	2,434	20
Blacks	778	45
	151,453	

Average price, 60c.

ALBERTA PROVINCIAL SHEEP-BREEDERS' ASSOCIATION

BY W. J. STARK, SECRETARY

The statement of our wool sales shows a total of 63,922 pounds sold. Details with the amount of each grade, and the prices obtained, are herewith given. To get the actual amount of wool sold, the weight of the sacks must be deducted—317 sacks at 3½ pounds each.

The following table shows the growth of this industry so far as our association is concerned:—

Year	Sold	Contributors
1915.....	12,998	32
1916.....	51,889	102
1917.....	63,922	165

The total quantity of wool sold by us this season would have been much larger, had not buyers from some of the large firms gone through the country picking up wool around 50 cents from members, leading them to believe that this was more than they would get through our associa-

tion's sale. As the price was abnormally high it can be readily understood how this would influence those not in close touch with market conditions.

STATEMENT OF WOOL SOLD

Grade	No. of bags	Lb.	Price per lb.
Fine combing.....	16	3,161	60
Fine clothing.....	19	3,783	54
Fine med. combing...	58	12,096	65
Med. combing.....	92	17,804	63½
Med. combing, wash'd	3	333	65
Low med. combing ..	57	11,594	60
Low med. clothing..	1	188	55½
Coarse.....	48	10,474	56
Lustre.....	1	173	52
Rejects.....	12	2,603	42
Gray and black....	5	689	45
Locks and pieces....	2	347	20
Tags.....	3	677	20
	317	63,922	

PINCHERS' WOOL-GROWERS' ASSOCIATION

BY J. W. HARWOOD, SECRETARY-TREASURER

The following is a detailed statement of the sale of wool held by the Pincher Wool Growers' Association:—

Grade	Lb.	Per lb.
Fine combings.....	6,915	59c
Fine med. combings....	5,757	60

Med. combings.....	27,735	60
Low combings.....	9,223	59
Fine clothing.....	562	53
Fine med. clothing.....	6,533	57
Rejects.....	3,491	42
Gray and black.....	160	40
Locks and pieces.....	409	30
Tags.....	501	20

THE LACOMBE WOOL-GROWERS' ASSOCIATION

BY A. J. CAMERON, SECRETARY

Below is a statement of the sale of this association's wool for 1917. All our wool was sold to P. V. Lewis of Lethbridge at the following prices:—

Grade	Lb.	Per lb.
Fine combing.....	3,106	61c
Fine clothing.....	1,725	56
Fine med. combing.....	10,293	63
Med. combing.....	18,528	62

Med. clothing.....	5,324	60
Low med. combing.....	2,877	61
Coarse.....	791	58
Rejects.....	610	43
Black.....	172	40
Mohair.....	50	60
Locks and pieces.....	251	30
Tags.....	1,163	22
Ungraded.....	655	60
	<hr/>	
	45,540	

VERMILLION WOOL-GROWERS' ASSOCIATION

BY JOB MACE, SECRETARY-TREASURER

Our wool was collected and graded by Government grader at Vermillion. Buyers were advised by telegrams. The wool was sold by asking for offers. The total expense for handling was $\frac{3}{4}$ c per lb. At present our association does nothing but handle the wool.

The following is a statement of sales:—

Grade.	Lbs.	Lb.
Fine combing..	7,078 $\frac{1}{2}$	
Fine clothing.....	4,525 $\frac{1}{2}$	
Fine med. combing, firsts.	8,399	
Med. combing, firsts.	8,751 $\frac{1}{2}$	
Med. clothing, firsts..	4,294	
Low med. combing.....	2,058	
Coarse.....	937	
	<hr/>	
Total.....	36,043 $\frac{1}{2}$	at 59 $\frac{1}{2}$ /16
Rejects.....	416	40c
Gray and black..	219	40
Locks and pieces.....	37 $\frac{1}{2}$	15
Tags.....	717 $\frac{1}{2}$	15
	<hr/>	
Grand total.....	37,433 $\frac{1}{2}$	

BRITISH COLUMBIA

INTERIOR OF BRITISH COLUMBIA WOOL-GROWERS' ASSOCIATION

BY C. E. LAWRENCE, SECRETARY-TREASURER

Below is the information asked for:

- 10,200 lb., price obtained 61 $\frac{1}{4}$ cents for all classes except locks and pieces, which made 20 cents.
- By private tender.
 - (a) Kamloops.
 - (b) By circular with statement of the wool grader.
 - (c) Personal acceptance of tender.
 - (d) Can't answer this, as much

labour was voluntary and Secretary-Treasurer's remuneration not yet decided upon.

- The Association is making every effort to increase wool production by publishing information and urging conservation of breeding stock; also, the elimination of coyotes, or demonstration of coyote proof fencing.

AT THE CENTRAL WAREHOUSE, TORONTO

IN addition to the quantities of wool included in the foregoing reports, there still remains in storage at the central warehouse operated by the Live Stock Branch of the Dominion Department of Agriculture at Toronto around 250,000 pounds of Western Range and Domestic wool, including 165,000 pounds from the Southern Saskatchewan Wool Growers' Association. Carloads were also being received from Western Canada nearly every day at the end of September. All will be sold at a later date. Following is a statement of Southern Alberta wool that has already been sold at the warehouse:—

	Price per Lb.	Approx. Pounds
Section 1—		
Fine staples—sacks...	64.0625	198,500
Section 2—		
Fine staple—bales..	65.705	57,000
Section 3—		
Fine medium staple— sacks.	65.705	92,000
Section 4—		
Fine medium staple— bales	67.695	49,000
Section 5—		
Fine clothing—sacks	62.72	135,000
Section 6—		
Fine clothing—bales	63.715	43,000
Section 7—		
Medium clothing	65	12,300
Section 8—		
Medium staple	63.125	40,000
Section 9—		
Low staple	56.0625	4,300
Section 10—		
Rejects, black, tags.	34	10,125
Section 11—		
Pulled wool	45	700

TO CANADIANS

The armies and civilian populations of the allied nations overseas need all the wheat, flour, beef and bacon that Canada can supply. Three things we can and must do while this overseas war-need continues. **WE MUST PRODUCE ALL WE CAN, WASTE NOTHING AND SHIFT OUR CONSUMPTION, as much as practicable, FROM WHEAT, FLOUR, BEEF AND BACON TO OTHER FOODS.** The other foods are just as wholesome for us but are not as suitable for shipment over seas in war time. Every man and woman in Canada should do their share of this necessary war service. It does not call for sacrifice. It does require earnest, intelligent, diligent thinking and action, sustained by the conviction that it is necessary that it will help to win the war, and that it will do us good individually and nationally —W. J. Hanna, Food Controller.

THE STUDY OF VETERINARY SCIENCE

NOVA SCOTIA

BY M. CUMMING, B.A., B.S.A., PRINCIPAL OF AGRICULTURAL COLLEGE

INSTRUCTION in veterinary science is given in connection with the classes at the Agricultural College, Truro. The instructor in charge of this work is D. J. A. Sinclair, whose home address is Cannington, Ontario.

In the year 1913 the Veterinary Association Act was passed, making provision for the constitution of "The Nova Scotia Veterinary Association," whose objects, in the terms of the Act, "shall include the study of Veterinary Science with a view to a more thorough understanding of the diseases, contagious and otherwise, to which the domesticated animals of the province are liable."

Only persons registered under the provisions of this Act are entitled to practice as veterinary surgeons in the province. Those who are entitled to register are graduates of any recognized veterinary college or school, who, however, must pass an examination, and be licensed by the Council of the Veterinary Association.

The number of students from Nova Scotia attending the Ontario Veterinary College since the passing of THE AGRICULTURAL INSTRUCTION ACT has very considerably increased.

Up to the declaration of war the Veterinary Association of Nova Scotia had made marked progress. Since that time progress has been retarded, owing to the fact that a number of veterinarians have enlisted, and those who are at home are for the most part busily occupied.

THE COURSE OF STUDIES.

The course in Veterinary Science is taken up in a practical way, and is planned with a view to providing

the student with a knowledge of all the most common ailments of domestic animals. Especial attention is paid to preventive measures. Demonstrations on living animals are given from time to time, and practical instruction as to the measures to be taken in emergency cases is a special feature.

In conjunction with the course in Veterinary Science instruction is given in horse judging. Living specimens of the recognized heavy and light breeds are brought into the live stock pavilion from time to time and practical instruction is given with a view to impressing the type, conformation and action of the respective breeds. In connection with this course, the student is instructed to recognize the various hereditary unsoundnesses of the horse.

The following branches are taken up:—

1. *Anatomy*—A course of lectures and demonstrations on the bones, muscles, tendons, ligaments, articulations, teeth, digestive, circulatory, respiratory, nervous, urinary and digestive organs, with a comparison of the difference in the organs of horses and cattle.

2. *Pathology*—A study of the various organs when diseased.

3. *Etiology*—A study of the cause of disease.

4. *Obstetrics*.—The care of breeding animals; with the causes, symptoms and treatment of diseases incidental of parturition.

5. *Medicines*.—The action, uses, doses and modes of administration for the prevention and cure of the ordinary diseases of farm animals.

6. *Horse Judging*.—As outlined in the foregoing.

Text-books—Judging Live Stock: Chapters on Horses (J. A. Craig); Common Diseases of Farm Animals (R. A. Craig); Diseases of the Horse (U. S. Department of Agriculture); Diseases of Cattle (U. S. Department of Agriculture).

QUEBEC

BY F. T. DAUBIGNY, M.V., DIRECTOR, SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE, MONTREAL

THE modern teaching of Veterinary science in the province of Quebec dates from 1886, when a French veterinary school was established by Dr. V. T. Daubigny, Sr., and Dr. E. Persillier Lachapelle, M.D. This school had rather difficult beginnings. This teaching had been attempted by three other schools before that time: the school of McGill University, which lived only a few years; that of Mr. Bruneau, of Montreal; and that of Mr. Couture of Quebec. These two consolidated in 1893 with Mr. Daubigny's school, the latter being already affiliated with the Laval University of Montreal. The object of this consolidation, which was granted by the Government at the request of the public, was to better control the teaching of veterinary science, to make it more uniform, more efficient, while affiliation with Laval University made it more permanent and more serious. From that time onward, the teaching of veterinary science, helped in an ever-increasing scale by the Montreal Laval University, the Government of Quebec, and also, for the last three years, by the Dominion Government, made marked and constant progress in our province.

THE PRESENT HOME OF THE STUDY.

The school was first installed in a rather rudimentary fashion in the University Buildings, St. Denis Street. It is now situated in a specially equipped building, 381 De Montigny Est (1913). This building is quite up-to-date. It includes offices and class rooms, large and well equipped laboratories of bacteriology, histology and food chemistry, a live stock room, a museum and a library. The inspection room and hospital are still in the old establishment of

Mr. Daubigny on Craig Street, but they will shortly be replaced by an up-to-date hospital of sufficient size, provided with a well ventilated and well lighted inspection room, and a surgery room for operations. The lot on which the hospital is to be built adjoins the school grounds; plans are ready and approved; necessary funds have been granted by the Quebec Government from the federal subvention under THE AGRICULTURAL INSTRUCTION ACT.

Work on the hospital will be started this year. With this building the system for the teaching of practical veterinary science in the province of Quebec will be complete.

THE COURSE OF STUDY.

From 1899, when the Quebec Department of Agriculture took our school under its care, granting an annual grant and giving scholarships, the teaching of veterinary science has steadily developed and improved. The course of study has been enlarged to suit the needs of the agricultural industry and to supply graduates qualified to hold important positions, veterinary doctors, food inspectors, agricultural lecturers, etc. The teaching staff has been greatly increased and improved; representatives of the Quebec Department of Agriculture and of the Dominion Department of Agriculture attend the examinations, as well as delegates of the Quebec College of Veterinary Doctors. The latter has absolute control over the admission of pupils to the study and practice of veterinary science. The entrance examinations have been made more difficult lately in order to get a better class of students, if possible. These efforts of the Quebec Department of Agriculture and of the Provincial Veterinary College have had the most beneficial effect upon the organ-

ization and improvement of the school courses.

WITH THE AID OF "THE AGRICULTURAL INSTRUCTION ACT."

Lastly, THE AGRICULTURAL INSTRUCTION ACT, passed by the Dominion Government for promoting agricultural teaching throughout Canada, and which grants a considerable amount to veterinary science upon the recommendation of the Quebec Department of Agriculture, has enabled us to realize our most ambitious wishes; it will help in a large measure to put veterinary teaching in our province on such a footing that it will compare favourably with the teaching as given in other provinces, and will complete in a happy manner the activities of the Quebec Government in this direction.

When our new hospital is built and equipped, then it will be possible to state that the study of veterinary science has received from the Laval University of Montreal, the Quebec Government, the Provincial Veterinary College, and the Dominion Government, all the help which is required to complete and improve

its teaching, to make it accessible to all, and thus to render the agricultural community every service which can be expected.

EFFICIENCY OF THE STUDY.

To-day, owing to these constant efforts and continual progress, veterinary teaching in Quebec has been raised to a praiseworthy efficiency. The teaching includes all branches of veterinary science as applied to agriculture, breeding and food products. Our graduates are competent to exercise their profession in various ways, by treating sick animals as veterinary surgeons, by protecting the public health, as cattle and food inspectors, or by working for the public health as directors of breeding and dairying. Many of our students have shown their worth on various fields of activity. Fifteen are now serving as veterinary surgeons in the Canadian army at the front, which shows that they can rise to any occasion. By granting twenty-five free scholarships at our school, the Quebec Government has made the study of veterinary science accessible to all our young men, even the poorest.

ONTARIO

BY J. H. REED, V.S., PROFESSOR VETERINARY DEPARTMENT, ONTARIO AGRICULTURAL COLLEGE

The Ontario Government a few years ago acquired from the late Dr. Andrew Smith his interest in and equipment of the Ontario Veterinary College. Since then the Government has erected an up-to-date College with up-to-date equipment, appointed a capable and efficient principal, viz., Dr. E. A. A. Grange, secured an efficient staff, and lengthened the term by one year. This allows the study of more subjects and the graduation of students better fitted for the practice of veterinary science.

At the Ontario Agricultural College

a course of lectures is given yearly, not with the idea of graduating veterinarians, but to instruct the students in the general management of stock, sanitation, construction of stables, etc., and other means for prevention of disease; the detection of disease and the treatment for minor diseases and accidents.

The profession is paying special attention to use of serums and anti-toxins for the prevention and cure of diseases, the control of contagious diseases and the general health of animals. The Ontario

Veterinary College and the Ontario Agricultural College, also the average veterinarian are anxious to instruct the general stock owner in the manner

in which stock should be housed, fed and handled generally in order to prevent and control disease.

THE ONTARIO VETERINARY COLLEGE

B EING the most largely attended of the two purely veterinary colleges in Canada, the Ontario Veterinary College receives the larger share of the annual grant of \$20,000 made to these colleges under the AGRICULTURAL INSTRUCTION ACT. A full description of the college, written by the Deputy Minister of Agriculture for the province, with a list of the staff and regulations, appeared in Vol I. of THE AGRICULTURAL GAZETTE, pages 979 to 984. While the college is still numerously attended, many students coming from the United States, as well as from distant parts of the empire, the tale of students has been considerably affected by enlistments for the war. Some idea of the extent to which this has gone can be gathered from the fact that of eight graduates receiving the degree of Bachelor of Veterinary Science this year, five are on active service. The present term extends from October 1st, 1917, to May 1st, 1918, with a vacation at Christmas time from December 22nd to January 3rd. Applicants for admission must either have a diploma from a recognized college or pass an examination in common school subjects. The college is in affiliation with the University of Toronto, and, by special Act of the Legislature, is under the direct control of the Ontario Government. Two degrees are possible of attainment, namely, Bachelor of Veterinary Science and Doctor of Veterinary Science.

B.VS.

Students for the degree of Bachelor of Veterinary Science must complete the third year's course of studies and be enrolled at the Ontario Veterinary College; and, prior to taking this third year's course, must have completed, both as to attendance and passing of examinations, the two years' course at the Ontario Veterinary College or at some other Veterinary College that is recognized by the said Ontario Veterinary College as qualifying them for admission to the third year's course at the Ontario Veterinary College, and must have practised with a qualified veterinarian for a period of at least five months.

D.VS.

A graduate holding the degree of Bachelor of Veterinary Science, desiring to proceed to the degree of Doctor of Veterinary Science, must by the first of January apply to the Senate for permission to undertake special research in a scientific laboratory or in some designated field of work allied to the live stock industry, and, upon permission being obtained, he must carry on special research and present a thesis on or before the first of May. Upon the said thesis being approved by the Senate, the degree of Doctor of Veterinary Science will be conferred upon the graduate, but only after the expiration of twelve months from the time of conferring the degree of Bachelor of Veterinary Science.

MANITOBA

BY C. D. MCGILVRAY, M.D.V., PROFESSOR OF VETERINARY SCIENCE, MANITOBA AGRICULTURAL COLLEGE

THE principles and practice of agricultural art and industry are always improved more noticeably where educational values are employed. The educational values are also noticeably enhanced and improved in proportion to the encouragement and support which they receive. To receive due recognition, the component parts of an agricultural education must necessarily serve some useful purpose to the community through those acquiring educational values at instructional institutions. In this regard, veterinary science values are worthy of review as to their relationship to successful animal husbandry and to the live stock interests of the country in general.

It is universally conceded that live stock is an absolute necessity to successful agricultural development, through tending to maintain soil fertility and by converting the cheaper materials grown on the farm into higher priced finished food products.

In the completion of this process, veterinary studies should materially assist and enable those practicing the art of agriculture to intelligently rear farm animals and to safeguard them against depletion from disease, especially diseases which are preventable, or of such a nature as may be communicable and endanger large numbers.

Not only should veterinary knowledge benefit those engaged in professional practice, and owners of live stock, but it should reciprocally benefit the community at large, by preserving the economic production and maintenance of live stock interests to such an extent as to afford a sufficiently abundant wholesome supply of meats and other animal food products, such as milk, butter and cheese, for the use of mankind.

NATURE OF THE INSTRUCTION

If these claims are to be supported, those acquiring educational values in veterinary science at agricultural institutions must be trained along such lines as will enable them to preserve a state of health and condition among farm animals, conducive to their well being and profitable utilization. The courses of instruction and study offered must, therefore, be selected and carefully arranged along such lines as will meet the needs. With this purpose in view, the student should be given general instruction as will enable him to become conversant with the structure and functions of the animal body during its state of health, the proper care and management of breeding animals and their young, and with the nature of common ailments of farm animals, their prevention, and first aid treatment.

The tendency at agricultural institutions, during the past, may have been to direct the application of veterinary science teachings mainly to the horse and to further circumscribe and confine the teaching to such subjects as anatomy, physiology, and certain diseases of the horse. Too little attention has apparently been given to cattle and other classes of live stock. The student in agriculture may, therefore, have failed to appreciate the values claimed for veterinary studies, through lack of instruction along lines suitable to his needs. This should be consistently corrected and adjusted, and can happily be accomplished by establishing a standard curriculum of veterinary subjects for agricultural colleges.

ADVISABLE STUDIES

The following outline is presented as approaching a suitable range of

veterinary studies for students in agriculture, and is in keeping with the course of study and instruction afforded at the Manitoba Agricultural College since the time of its inception:--

Anatomy and Physiology.

The essentials of these subjects embrace the structure and functions of the animal body, and are of importance in forming the groundwork in acquiring a true knowledge of animal life.

For convenience of study and description, the horse may be taken as the type and comparisons made, and deviations described, where they exist, in cattle, sheep and swine.

The course of study should include:

(a) A descriptive consideration of the bones, ligaments, joints and muscles, particularly those of the limbs. Special attention should be given to the occurrence of deviations in the structure inclining to faulty conformation, and to abnormal conditions liable to cause unsoundness, or to impair usefulness.

(b) A consideration of the digestive system:--

This should cover the structure and arrangement of the various organs and their functions. Its scope should include not only the digestive apparatus of the horse, but also of the other classes of live stock. The process of digestion, absorption and nutrition should be carefully presented as well also as the process of rumination in cattle and sheep.

(c) A consideration of the respiratory and circulatory systems:--

The structure and functions of the essential organs of these systems, including the air passages, lungs, the heart and blood vessels, the blood and course of circulation, should be fully elucidated.

(d) A consideration of the urinary and generative systems:--

The structure and functions of the various organs should be carefully presented and studied, and particular attention given to the male and female reproductive organs, including the udder of the cow and the secretion of milk.

(e) Consideration of the skin and its appendages, also the structure of the foot of the horse.

Special instruction should also be given on the determination of the age of horses, cattle and sheep by means of the teeth.

The Principles of Veterinary Medicine.

The essentials of this subject embrace the nature, causes, symptoms, treatment and prevention of disease.

Special attention should be given to diseases most commonly met with affecting farm animals particularly those which are preventable, or are of an epizootic communicable nature, as well as those due to eating poisonous plants.

Instruction should be given as to the methods employed in examining animals to recognize sickness, and for the general care and management of sick animals, including stable hygiene and sanitation.

Consideration should also be given to remedies suitable for the treatment and prevention of ailments among farm animals, preference being given to medicines such as might be kept on the farm.

Special instruction could profitably be given as to proper methods of administering medicines, and to the use and application of liniments, poultices, fomentations, bandages, and the dressing of minor wounds, such as barb wire cuts, to assist and promote healing.

Attention should also be given to the predisposing and exciting causes of unsoundness in horses, and demonstrations given as to methods of examining horses for soundness.

Instruction should also be given with regard to the castration of calves, lambs and pigs, and practical methods of restraining and securing animals.

Obstetrics and Hygiene of Breeding Animals.

The essentials of these subjects should be presented in a series of lectures and demonstrations dealing with breeding animals and their young.

The course of instruction should include the process of generation and reproduction, periods of gestation in domestic animals, the care and management of pregnant animals, and to diseases and accidents incidental to the pregnant state and following parturition.

Methods of first aid to the mother at parturition and means of determining obstacles to successful birth should be clearly elucidated.

Special attention should also be given to diseases and abnormalities affecting foals, calves and lambs, and means of lessening mortality among them.

Animal Parasitology.

The subject embraces the study of diseases of animals caused by parasites and is of great importance to live stock owners.

Special consideration should be given to diseases of the skin caused by parasites and to worms infesting the stomach and intestines of farm animals, liable to cause unthriftiness, impairment of health, and fatalities.

Among the diseases that might be given consideration would be diseases of the skin

caused by parasites, such as ringworm affecting calves; lice affecting all farm animals, including poultry; warbles of cattle; ticks; mange of cattle and horses; sheep scab. Worms infesting the stomach and intestines of farm animals, including bots in horses; pinworms, including the blood sucking varieties; stomach worms affecting sheep; fluke disease of sheep; gid disease affecting sheep; and tapeworm infestations affecting cattle and swine, transmissible to human beings through eating affected beef and pork.

Infectious and contagious diseases of animals

The occurrence of contagious diseases among animals is one of great importance, owing to their economic relationship to animal husbandry and to the live stock interests of the country in general.

This subject therefore deserves to be dealt with as exhaustively as possible, and in accordance with the most recent advances in veterinary sanitary science.

Among the diseases to be given consideration should be included the following:—Tuberculosis, Lumpy Jaw of cattle, contagious abortion and sterility, foot and mouth disease; contagious Pleura-Pneumonia, Texas fever, mange of cattle and horses, sheep scab, lip and leg ulceration of sheep, anthrax, blackleg; hemorrhagic septicemia, hog cholera, glanders and dourine in horses.

Special consideration should be given to

their nature, prevalence, causes, means of dissemination, symptoms, and methods of diagnosis by the various approved tests, and the best measures for their prevention and suppression.

The student in agriculture should also be instructed in the sanitary service laws and regulations relating to contagious diseases in Canada, together with the regulations governing the importation of live stock from other countries.

In the teaching of veterinary studies to students in agriculture, objective methods should be employed as far as possible, so as to enable students more readily to grasp the general principles of the subjects. This can be accomplished by the extended use of suitable charts and models and by practical demonstrations with the various classes of farm animals.

At the present time, in the province of Manitoba, there is no college graduating veterinary surgeons, and the course of instruction at the Manitoba Agricultural College is intended solely for its values to those engaging in agricultural art and industry.

SASKATCHEWAN

BY W. J. RUTHRFORD, B.S.A., DEAN OF THE FACULTY OF AGRICULTURE, SASKATCHEWAN UNIVERSITY

THE Saskatchewan Veterinary Association is a strong, active enterprising body. It is affiliated with the University. The University examines all candidates desirous of becoming licensed to practise in the province. The board of examiners is composed of five members, of which the Dean of the College of Agriculture and the college veterinarian are two. The other members are appointed by the University. Examinations are held in January and June at the University at Saskatoon.

The Veterinary Association holds a summer session of four days' duration at the University usually during exhibition week. The pro-

gramme consists of lectures, demonstrations and clinics—the main object being that of keeping the profession up to date on both the science and practise of veterinary medicine and surgery.

Veterinary science is taught at the University in connection with the agricultural courses for the purpose of making the students more efficient in the matter of live stock management. Anatomy and physiology are taught by the biology department.

Two courses are taught by a practising veterinarian in the city, who also looks after the health of the college stock.

The courses are as follows:—

1. Twice a week.

(a) *Materia Medica*—fall term.

A study of properties of various drugs, the amount of each used, together with other materials used in the treatment and prevention of diseases of farm animals.

(b) *Veterinary Medicine and Surgery*—winter term.

A study of the causes, symptoms and

treatment of the common diseases of live stock, demonstrations of simple surgical operations and castration. Preparatory to management.

2. *Obstetrics*. Two lectures per week. winter term.

A treatment of the care and management of pregnant animals, diseases and accidents accompanying parturition.

ALBERTA

BY H. A. CRAIG, B.S.A., DEPUTY MINISTER OF AGRICULTURE

THE veterinary course in the schools of agriculture is in charge of Dr. Talbot, Provincial Veterinarian. Commencing at the first of the term, Dr. Talbot delivers lectures in each of the three schools, spending one week at each before proceeding to the next, each three weeks making the rounds of the schools. By this arrangement a seven weeks' course is given to both first and second year students. This course embraces work in the following subjects:—

First Year.—Anatomy.—The structure of the animal body—bones, joints, ligaments, muscles, circulatory system, nervous system, internal organs.

Physiology.—The functions of the animal body—digestion, respiration, excretion, blood supply.

Stable Hygiene—Dietetics.

Second Year—Common ailments of farm animals—diagnosis, treatment, prevention.

Medicine—Simple remedies, their nature, uses and application.

Simple surgery.

Care of animals during gestation—parturition.

Care of horses' feet and horse shoeing.

Animal parasites.

The course has proven exceedingly popular with the students. The boys exhibit a keen interest in the work and get a sufficient grasp of the subject so that they are enabled upon their return home to treat the ordinary diseases and ailments of

farm stock. Perhaps the greatest benefit derived from the course is due to the fact that the boy is able to determine what is wrong with an animal in the early stages of sickness and is thus able to secure the services of a professional man, if necessary, a matter which is often delayed until too late where the owner of the stock is not able to make a proper diagnosis.

Special attention is paid to infectious diseases such as tuberculosis, actinomycosis, blackleg, hog cholera, glanders, strangles, epizootic callulitis and typhoid fever.

The study of obstetrics is taken up by beginning with generation, reproduction and development of the young with the indications and durations of pregnancy; also the care and treatment of animals prior to and following parturition.

Parasitic diseases are also dealt with and those parasites found most frequently in the cow, horse, sheep and pig, as well as the most important worms found infesting the elementary canal of farm animals.

Considerable attention is paid to bone diseases and unsoundness of the horse and practical demonstrations are given in all branches of the work at every opportunity.

For the students who proceed to the degree course at the University, more advanced work is given in veterinary science.

THE AMERICAN VETERINARY MEDICAL ASSOCIATION

Frederick Torrance, Esq., B.A., D.Vs., Veterinary Director General of Canada, has been elected President of the American Veterinary

Medical Association. This Association, which is the largest of its kind in the world, has a membership of upwards of three thousand.

QUEBEC

MACDONALD COLLEGE

SALES OF PURE BRED SHEEP

Macdonald College, in conjunction with the local wool growers' and sheep breeders' associations of the province of Quebec, and the Canadian Pacific Railway Company, is holding a series of auction sales of pure bred sheep at points in Quebec.

The sales began at Waltham, in Pontiac county, on September 26th, and will conclude at Megantic in Compton county, on October 10th. The dates have been arranged to fit in with fall fairs.

ONTARIO

THE PASTEURIZATION OF MILK

BY D. H. JONES, B.S.A., PROFESSOR OF BACTERIOLOGY

I have read with interest the article of Professor Vanderleck, in THE GAZETTE of July, on the subject of milk pasteurization. We have no series of milk feeding experiments of our own on which to base our opinions regarding the food value and liability to produce disease, of pasteurized milk. Therefore, an expression of our view on the subject must be based on the research work of others.

Pasteurization is a term loosely applied to the heating of milk to various temperatures for varying lengths of time. As wide a range of temperatures as from 140 degrees F. to 194 degrees F. have been recommended and length of time of exposure to heat varying from a moment to two hours. This is most unfortunate, for until there is some generally recognized standard of pasteurization, so-called pasteurized milk may have a wide range of food values dependent upon the method of treatment to which it has been subjected.

The primary object of pasteurized

milk that is to be consumed as milk is to destroy any disease-producing bacteria which may have gained entrance to it.

It has been demonstrated by Dr. M. J. Rosenow of the Harvard Medical School that the pathogenic bacteria liable to be found in milk, including *B. tuberculosis*, *B. typhosus*, *B. diptheriæ*, the dysentery bacillus, scarlet fever, virus and streptococci of sore throat, are destroyed in milk that is heated to 140 degrees F. for 20 minutes; and further that 90-99 per cent of other bacteria present are destroyed at this temperature. These conclusions have been confirmed by others, both in America and Europe.

As this temperature, or even 145 degrees F. for 30 minutes, does not interfere with the creaming properties the albumen and enzymes, and gives something of cooked flavour to the milk, we would favour pasteurization of milk by heating it to 145 degrees F. for 20-30 minutes rather than the higher temperature of 152 degrees F.

DISTRICT REPRESENTATIVE FEATURES

COMPETITION INSPECTION WORK.

W. D. Jackson, Carleton County,
Carp:—

Recently I spent much time with field inspection work in connection with our North Gower Seed Centre, C. S. G. A. girls' garden competition, boys' potato growing contest and acre profit competition. In connection with the girls' garden and canning competition of the 26 competitors about 70 per cent of them have done good work and have good gardens, probably 30 per cent of all competitors have excellent gardens and have secured rather phenomenal results, some of the competitors having as high as 47 varieties in their small gardens, including raspberries, gooseberries, strawberries, corn and a large variety of vegetables. Quite a number of these gardens have scored well over 90 per cent and in some cases rather an unusual yield of raspberries have been secured this season. If we are able later in the fall to secure reports on yield from these gardens, we will have some unusual and high figures as to what girls in this county have been able to produce for household use and also for canning purposes. In regard to the potato growing contest our competitors are showing a decided improvement and increased yield over the general potato crop, in this county and over the main crop on their farms, a condition that has always existed in connection with our potato growing contest during the past few years.

In Carleton county 60 per cent of the three weeks' labour for haying asked for by the farmers, was supplied and for the whole Ottawa Valley some 900 applications for this three weeks' labour were received and something over 200 men supplied. One hundred and ninety men were sent out to the farms from this district for one day at a time and were distributed to the various places where they were to work with automobiles supplied by the citizens of Ottawa. This form of labour was very satisfactory to the farmers, and in cases they paid 30 cents an hour, although we have instances on record where farmers were so well satisfied with the work that they paid the men \$4.00 per day.

TREATING FOR SMUT.

Fred. Forsyth, Lanark County,
Perth:—

I visited one of my treating-grain-for-smut experiments at the home of Henry McDonald, Drummond Centre. Mr. McDonald didn't believe there was much in treating grain for smut. This spring

to convince him, I went out to his place and treated sufficient seed oats to sow about six acres. He sowed the rest of the field with the same kind of oats but they were untreated. In visiting the field I was greatly pleased to notice that in the treated seed neither Mr. McDonald nor myself could find a single head of smut, while not three feet away in the untreated portion, we could find a good sprinkling of smut heads. We made several counts and estimated that there were between five and ten per cent of the heads with smut in the untreated portion. We will have no trouble in getting Mr. McDonald or his neighbours to treat their seed another year.

HOME GROWN AND IMPORTED
ALFALFA SEED.

H. C. Duff, Grey County, Markdale:

Mr. R. A. Petch of Meaford has 23 acres sown to alfalfa-grown seed. One field of 15 acres was sown in two parts, one by his own farm-grown seed and the other by imported seed. Both parts received the same cultivation, and were treated with soil from an old alfalfa field before sowing. He estimated that the first cutting from the former will yield two tons per acre, as compared with one and one-quarter tons from the latter. There is a marked difference in the stand of these two plots. Weeds and off-coloured alfalfa plants are beginning to show up in the plot sown with the imported seed. He intends to grow all his own seed and increase the acreage, as he secures three cuttings per year and has not suffered any loss by winter injury, and the yield and feeding quality out-class any hay that he has ever sown.

Sweet clover came to the assistance of Mr. Doran of Meaford who has been trying to grow a crop for the past few years on a sand hill. Everything from oats and buckwheat to fruit trees have refused to thrive until he sowed this clover. Now he has a thick stand and no weeds. The cows and horses like the hay as well as the common red. He is planning to use this crop in other poor fields as a soil builder and hay yielder.

One Meaford fruit grower has 600 young peach trees. The orchard is in good shape and the trees healthy and thriving except for a sudden outbreak of "leaf curl," which has infected two-thirds of the trees very badly. Only a few varieties, such as the Crosby and Crawford, have been able to escape the disease, and some of them have leaves that are beginning to curl. His neighbour who sprayed a few peach trees that he has with the winter strength lime sulphur, has no "leaf curl" at all.

ORCHARD DEMONSTRATION IN DUNDAS COUNTY

BY E. P. BRADT, B.S.A., DISTRICT REPRESENTATIVE

DUNDAS county is especially adapted for the production of high-class apples. The soil and climate favour quality and colour in the fruit. The county is known as the "Home of the McIntosh Red" and this variety along with the Fameuse grows to perfection in the county.

It was considered advisable to encourage fruit growing in a district so adapted to it. In order to indicate the possibilities of returns from an acre of orchard land in the county, the Department of Agriculture, Morrisburg, in co-operation with the Ontario Fruit Branch, arranged to conduct a demonstration orchard. The demonstration was conducted over a period of three years. The orchard selected was a badly neglected one. The trees were about twenty-five years of age. Forty-five McIntosh Red trees and six mixed varieties made up the orchard. It was located about three miles west of Morrisburg on the river road.

The first year the orchard was thoroughly pruned. It required 20 day's labour to do the pruning. It was also manured at the rate of 20 tons of barnyard manure to the acre. The ground was ploughed shallow between the rows, in the spring of the year. The trees were left standing on a twelve-foot strip of sod. The cultivated portion was seeded with red clover about the middle of June. The last two years the land was left in sod entirely, the crop being cut and allowed to remain on the ground. We favour the last method of handling an orchard in this district. The fruit takes on a better colour and as a result has a better flavour.

In only one year of the three was it found necessary to thin the apples. That year practically 50 per cent of the crop was removed early in July and the trees still had all they could support in the fall. The thinning re-

sulted in about 15 per cent more No. 1 fruit, and equally as much in quantity, considering all grades as compared with area left unthinned. The thinning paid well for labour spent.

The following is a summarized statement of results of work with the orchard for three years. The last year an itemized report is given so that the method of calculation of profits may be shown:

1914	net profit per acre	\$205 31
1915	" " " "	53 58
1916	" " " "	349 57

Average	" " " "	\$202 82
Financial statement, demonstration orchard, 1916.:		

EXPENDITURES.

Cultivation.

Cutting grass $\frac{1}{2}$ day, man and team at \$4.00	\$2 00
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Pruning

4 days at \$2 per day.	\$8.00
$\frac{1}{2}$ day gathering brush, at \$2.	1 00

Spraying

Power outfit spraying six times, requiring six hours each time, at \$1 per hour team and outfit.	36 00
Cost of spray material 6 applications	
85 $\frac{3}{4}$ gal. lime sulphur at 17c. per gal.	\$14 58
65 lb. arsenate of lead at \$9.15 per cwt.	5 95

Picking

120 barrels apples at 25c. per barrel,	30.00
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Packing and grading

120 bbls. at 35c. per bbl.	42 00
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Packages

120 bbls. at 45c. each	54 00
Hauling fruit to station, 5 trips at \$1.50 each	7.50

RECEIPTS

84 bbls. No. 1 McIntosh Red at \$6.00	\$504 00
14 bbls. No. 2 McIntosh Red at \$5.00	70.00
16 bbls. No. 3 McIntosh Reds at \$3.00	48.00
1 bbl. No. 1 Wealthy at \$3.00	3.00
1 bbl. No. 2 Wealthy	2.00
1 bbl. No. 1 Mann at \$3.00	3 00
2 bbls. No. 1 Duchess at \$2.00	4.00
1 bbl. No. 1 Pewaukee at \$3.00	3.00

Total \$637.00

Receipts, \$637.00.

Expenditures, \$201.00

Net profit, \$436.97 from $1\frac{1}{4}$ acres, or \$349.57 per acre.

SASKATCHEWAN

ACTIVITIES OF THE PROVINCIAL DEPARTMENT OF AGRICULTURE

IF anybody had any doubts regarding the success of co-operation as applied to Saskatchewan agriculture, a copy of the annual report of the Co-operative Organizations Branch for the year ending April 30, 1917, would bring assurance that not only has the co-operative movement succeeded up to the present time beyond expectations, but that its future is assured owing to the appeal which its record of achievement makes to the business instinct of farmers.

The report referred to deals primarily with the work of the agricultural co-operative associations, but it also deals with the work of the co-operative creameries, the Co-operative Elevator Company, the Municipal Hail Insurance Association, and the wholesale trading department of the Saskatchewan Grain Growers' Association.

Since the passage of the Agricultural Co-operative Associations Act three years ago 352 associations have been formed, being an average of two associations per week for the whole of the period. Of these 91 were organized during the year ending April 30, 1917. One of the best ways of showing the rapid development of co-operation amongst our farmers is to quote from one of the tables in the report the total turn over of the associations in the three years since the passage of the Act. For 1914 the amount was \$281,354.64; for 1915 it was \$964,892.67; and in 1916 it reached \$2,122,832.90. This means that more than seven and one half times as much business was done by the associations in 1916 than in 1914. One of the associations with assets of only

\$192.51 did a business for the year amounting to \$85,302.80.

CATTLE DISTRIBUTION.

The demand for cattle under the Live Stock Purchase and Sales Act of the province has been greater during the past summer than ever before. Up to the end of June, six carloads of cattle had been purchased in Eastern Canada, but since that date, owing to the increasing difficulty of procuring them and the high prices demanded, but few have been secured from this source. The great majority of the cattle so far supplied have been western-bred heifers, and several carloads of these have been purchased on the Winnipeg market, while many orders have been filled locally. There are at the present time orders for about seven more carloads, and as additional orders are coming in daily it is certain that the number supplied will be far in excess of former years. Most of these cattle are going into districts in the vicinity of one or other of the co-operative creameries, where they will either at once begin to contribute the raw material to the creameries or else will lay the foundation of future dairy herds.

The Live Stock Branch has been able to secure a number of good grade ewes for distribution this fall. A great many inquiries for sheep have been received, and the demand is certain to be great in spite of the fact that prices promise to be higher than ever.

Announcement has been made that returned soldiers are to be supplied with cattle on a basis of ten per cent cash, but the regulations under which this concession is to be made had not

been issued at the time this was written.

CO-OPERATION IN LIVE STOCK SHIPPING.

With the object of encouraging agricultural co-operative associations to take up more extensively the shipping of live stock the Co-operative Organizations Branch is issuing receipt and accounting forms for use in connection with the marketing of live stock. These are based on the experience of associations carrying on this kind of work during recent years. The forms tend to simplify the business greatly, and contain many labour-saving devices. They are accompanied by a bulletin explaining their use. One set, which is sufficient to record a whole year's business, is supplied free to every association engaged in live stock marketing, and afterwards they are to be supplied at cost, which will be in the neighbourhood of \$5 per set.

NEW BRAND BOOK.

The department is now engaged in the preparation of a new brand book, which will contain all horse and cattle brands allotted or transferred since June 29, 1912, when the last brand book was issued. This is an important announcement which

should be particularly noted by the councils of rural municipalities, who, according to the recent decision of the Supreme Court *en banc*, are running risks of loss if they neglect to furnish their poundkeepers with a copy of the brand book. The preparation of the book will take considerable time, as several thousand cuts will be necessary, and the compilation and checking is a task involving much labour and care.

BRAND ALLOTMENTS INCREASING.

During the past year there were 1,356 cattle brands allotted, which is an increase of 304 over 1915, while the horse brands allotted were 707, being an increase of 67 for 1916. In addition there were dealt with in the brand office 90 applications for the transfer of brands; 24 changes in the designs or positions of brands originally allotted; 22 searches and extracts of the brand registers, not including 8 free searches and extracts made for members of the Royal North-West Mounted Police. The number of cattle brands renewed in 1916 was 494, being an increase of 148 over the previous year. The number of horse brands renewed during the same period was 427, being an increase of 21 over the previous year.

Canada has officially and unofficially set her teeth to the job of seeing the war through to the limit of her resources. She has set us (United States) many shining examples that deserve earnest imitation. She has held staunchly to the conclusion for three years that food will win this war for the democratic peoples of the world. With a population less than that of the state of Pennsylvania, Canada has made a record that will live as long as American history is read.—*Barton W. Currie.*

PART III

Rural Science

SUMMER COURSES IN AGRICULTURE FOR TEACHERS

NOVA SCOTIA

BY L. A. DEWOLFE, TRURO, NOVA SCOTIA

THE attendance at our summer session this year was 148. Of this number, 138 were women and only 10 were men.

It was possibly our best session yet held. Nearly all were workers; and the sum total of the work done was marvellous.

We had fewer graduates than usual. For some reason the older students did not return to finish their course. As a result we have only 18 qualifying for diplomas. On the other hand we have the correspondingly large

number of 71 awarded one-year certificates.

Canning of vegetables becomes increasingly popular. Unfortunately, very few vegetables were ready to use during the early part of the session. That means the crowding in of extra work towards the end.

Our school garden, cared for by the students, is the best yet. Our model exhibition was also a success. As a result, we look for an increase next year in both gardens and school exhibitions.

NEW BRUNSWICK

BY R. P. STEEVES, B.A., DIRECTOR ELEMENTARY EDUCATION

THE Rural Science Schools at Woodstock and Sussex opened on the afternoon of July 10th. The term lasted one month. At both schools 97 students were enrolled.

First year students 71
Second year students 26

Classes in (1) Nature Study and Animal Life, (2) School Gardening and Plant Propagation, (3) Chemistry of Soil, Plants and Animals, (4) Physical Nature and Environment, and (5) Method in Teaching, were formed, all pupils taking work in every subject.

Excellent work was done throughout the term. The students were enthusiastic, entering into both work and recreation with zest and pleasure.

Local values in education were emphasized.

During the term evening addresses were delivered by Chancellor Jones, of the University of New Brunswick, on the "Natural Resources of New Brunswick," by Rev. L. A. Guertin, vice-president of St. Joseph's College, on "Agriculture and Education," and by Rev. Frank Baird of Woodstock on "Rural Science Schools as

a Provincial Asset." An illustrated address on "The Household and its Inhabitants" was also given by Mr. Wm. McIntosh, of the Agricultural Department, one of the instructors at Sussex.

All classes were given demonstration work in canning and preserving food products by Miss Jean Peacock.

Addresses were also given by Miss Nita Nixon on "Prevention of Waste in Food Preparation" and by Miss Peacock in connection with the canning demonstrations.

At both schools appropriate closing exercises were carried out on the evening of August 9th; schools closing on the 10th.

MACDONALD COLLEGE

BY F. C. HARRISON, D.Sc., PRINCIPAL

THE third session of the summer school for teachers of Macdonald College, opened on July 23rd and closed on August 18th. The attendance was less than in other years. The decrease in attendance may have been due to labour conditions, and the call for greater production. Many teachers are spending the summer in productive work. Though the number was small the quality was good. The students showed much interest in the different subjects, and much earnest work was done. Nearly every hour of the day, which occasionally began at 5 a.m., when excursions for the study of birds were held, was profitably employed. Apart from the regular lecture or laboratory periods much time was given by the students to the work of collecting, drying and mounting specimens of weeds, grasses, clovers, tree leaves, perennial flowers, shrubs and other materials. Each teacher returned to her school with good collections of specimens neatly mounted and correctly named. These should be of great service for reference purposes, and for inspiring the pupils to collect. In the nature study class the students kept weather records which were decorated in the art class—an illustration of correlation of subjects in regular school work.

The work of the school was divided into five courses, as follows:—

1. Nature study, by D. W. Hamilton,

Ph.D., B.S.A. lecturer in nature study and elementary agriculture.

2. Elementary agriculture, by J. E. McQuat, B.S.A., demonstrator to rural schools.

3. Horticulture and gardening, by A. H. Walker, florist.

4. Art, by Mrs. Ewart (nee Miss Doane) formerly instructor in art.

5. Music, by G. A. Stanton, L.R.A.M., A.R.C.M., Instructor in Music.

At the close of the session written and practical tests were given in each subject.

In addition to other items of entertainment during the session, on Saturday, August 4th, a sail on the steamer Empress up the Ottawa river to Carillon, continuing on the return trip to Montreal through Lachine rapids, was much enjoyed.

The closing exercises were held in the assembly hall on Friday evening, August 17th. In the absence of the principal, Dr. Harrison, Professor Lochhead presided and addressed the students. Prizes for the highest standing in the nature study and agricultural courses were awarded. Certificates were presented to all who completed the course.

Remarks by the chairman and by Dr. Hamilton were to the effect that the public and school trustees in particular, should understand that a certificate of attendance from any summer school does not entitle the holder to rank as a *specialist* in the subjects of the course. Those interested in the maintenance of sum-

mer schools, or other short courses, hope, however, that the inspiration, ideas, as regards method of teaching, and help in subject matter obtained by teachers in attendance will prove very helpful to the latter in their teaching work, particularly in nature study and elementary agriculture.

THE COURSES

The courses were as follows:—

COURSE 1.—Nature Study.

1. Aims of nature study teaching.
2. Methods of teaching nature study.

13. Minerals and Rocks—their recognition, uses and distribution in Quebec.

Field and laboratory work with plants, birds and minerals.

COURSE 2. Elementary Agriculture.

1. How soils are formed.
2. Different types of soils—their recognition and value.
3. Fertilizers and their use.
4. Leguminous plants in relation to agriculture.
5. Some common plant diseases—recognition and treatment.
6. Collection, recognition, and discussion of uses of common grains, grasses and clovers.



MACDONALD COLLEGE SUMMER SCHOOL CLASS, 1917

3. Correlation of nature study with other subjects.

4. Nature study lesson plans.

5. The nature study course for rural schools.

6. Nature study calendars and records.

7. Plants—The general structure, work and uses of the parts of a plant.

8. The structure and germination of seeds.

9. How plants prepare for winter.

10. Trees—their recognition, habits, and uses.

11. Weeds—their identification, collection, and mounting.

12. Birds—their recognition, habits, and protection.

7. Seed selection and scoring.

8. The structure, transformations, and habits of a few common insects representing different orders.

9. Injurious Insects—their recognition and treatment.

10. Farm animals, with use of score cards.

11. Feeds and feeding; balanced rations.

12 Poultry.

Practical work in the field and laboratory.

COURSE 3. Horticulture and Gardening.

1. The propagation and requirements of common plants.

2. The making, rooting and potting of cuttings.

3. The care of house plants.
4. The making and care of window gardens.
5. The best soils and fertilizers for plants.
6. The potting and forcing of bulbs.
7. The planning, planting and care of home and school gardens.
8. The best varieties of garden flowers and vegetables.
9. The planting and care of shrubs and trees.
10. The ornamentation of home and school grounds.

Practical work in garden and laboratory.

COURSE 4.—Art.

1. Water colour.—
 - (a) Painting of flowers from nature.
 - (b) Conventionalization of flowers and making and application of stencils.
 - (c) Simple landscape painting.
2. Crayon:—
 - (a) Drawing of flowers and landscape.
 - (b) Use of crayon in design.
3. Pencil:—

Drawing of grasses, leaves and flowers in accented outline.

Besides practical work as above, students received lectures in:—

- (a) Purpose and scope of art work in the public schools.

- (b) Drawing on the blackboard.
- (c) Teaching perspective.
- (d) Theory of colour.

COURSE 5. School Music.

The course in school music consisted of about twenty class lessons in the subject-matter and the art of teaching class-singing, with especial regard to rural school conditions. The main topics were:—

- (1) The place of music in elementary education.
- (2) School Songs—their selection, teaching and rendering.
- (3) Sight-singing—the staff notation approached by the tonic sol-fa method.
- (4) Ear-training.
- (5) Voice-culture for children.

Questions and class discussions were invited on particular difficulties connected with teaching music in country schools. Additional lectures were given on musical appreciation, community music, and the literature of school music. Occasional organ recitals, with explanatory remarks, were arranged, at which the attendance was voluntary.

ONTARIO AGRICULTURAL COLLEGE

BY J. B. DANDENO, INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

BY an arrangement made between the Departments of Education and of Agriculture, courses of study are provided at the Ontario Agricultural College for teachers who expect to teach agriculture in either primary or secondary schools. The course of study for teachers of primary schools is divided into two parts, each of five week's duration, and taken in two consecutive summers. On the successful completion of these two parts a certificate in agriculture is awarded.

The chief aim of these short courses, which commence about July 3rd, is to prepare teachers to give instruction in elementary agriculture and horticulture in the schools of Ontario.

The course of study provided for teachers of secondary schools is similarly arranged and divided, and runs concurrently with that of the course for teachers of primary schools.

The number in attendance as compared with previous years is given in the following summary:—



A SECTION OF THE CLASS OF 266 TEACHERS THAT TOOK THE SUMMER COURSE AT THE ONTARIO AGRICULTURAL COLLEGE, 1917

	Elementary				Intermediate				
Year	Part I.		Part II.		Part I.		Part II.		Total
	Men	Women	Men	Women	Men	Women	Men	Women	
1911...	8	75	1	16					100
1912	16	65	2	23					106
1913...	14	64	5	36	23	4			146
1914	8	55	5	27	13	4	14		126
1915...	15	39	5	18	17	1	9	1	105
1916...	11	99	9	31	15	3	14	1	183
1917... ..	15	138	7	81	9	1	13	2	266

So far as can be gathered from the applications for admission to the summer courses in 1917, the following statement shows the number of students in attendance from each county where five or more attended. Only the elementary classes are given in the count:—

County	Part I	Part II	Total
Dundas	20	3	23
Perth.	11	10	21
Middlesex	8	12	20
Kent	14	4	18
York (including Toronto)	7	5	12
Wentworth	7	3	10
Ontario	7	2	9
Carleton.	5	2	7
Grenville	4	3	7
Grey	4	2	6
Leeds.	3	2	5

It is worthy of note that Dundas county sent the largest representation of teachers to the summer school. Middlesex and Perth ranked next, but it should be remembered that each of these two counties contains more than one inspectorate—Middlesex three (including London) and Perth two.

During the term a course of ten lectures was given by Mr. H. S. Foght, specialist in rural education of the Bureau of Education, Washington, on the following subjects:—

1. The Rural Problem Analyzed in Relation to its Educational, Social, and Religious Elements;
2. Institutional Means for Remaking Rural Life;
3. The Farmer's Wife, A Vital Factor in the Problem;
4. The teacher and community leadership;

5. The Complete Rural Community School (illustrated);

6. Good Roads and Education (illustrated);

7. What Every Teacher Can Do for the Advancement of Vocational Education (illustrated);

8. The Teacher and the Play-Life of the School (illustrated);

9. The Meaning of Modern Sanitation in School and Home (illustrated);

10. The Revitalized Course of Study for Rural Schools.

These lectures formed a part of the courses for all teachers.

The activities outside of the regular classes consisted in instruction and practice in games and sports suitable for schools. A pageant was given one Saturday afternoon representing "The Call of the Country." Regular instruction in swimming was given to the women students in the swimming tank of the college gymnasium with pronounced success. Upwards of fifty of the teachers learned to swim to the extent that at least a dozen strokes as a minimum was accomplished.

The school garden forms an important part of the first year's work. The Macdonald Consolidated School gardens are available for class purposes through an arrangement made with the Board of Trustees and the Horticultural Department of the College. This garden illustrates what may be done in the way of crop production, as there is at present a crop of vegetables of various kinds valued at \$150.00.

Practically all of the teachers in attendance roomed and boarded at the College. This arrangement gives



ONTARIO AGRICULTURAL COLLEGE SUMMER COURSE--STUDENTS GARDENING, 1917

opportunity for participation in games and sports, and a chance for mutual acquaintance among the teachers. Two Saturday excursions were provided,—one to the “Rocks” of Elora, and the other to the “Pot Holes” of Rockwood.

At the close of the summer courses at the College, a considerable number of the teachers made arrangements to assist in harvesting the crop of small fruits, some in Norfolk county, and others in the Grimsby district. It is very gratifying, indeed, to note that these teachers are giving up all their vacation in the interests of agriculture and crop production. Some teachers made a hurried trip to their schools to supervise their school garden plots before engaging in the harvesting of the fruit crop.

FARM MECHANICS

Commencing on August 6th a four weeks' course in farm mechanics was held in the Mechanical Building of the College. This course provides practical instruction in farm mechanics for teachers who expect to qualify to teach agriculture as a department in a secondary school. The following gives in detail the scope of the work:—

1. The use and care of common wood-working tools; making simple objects required on the farm such as hen coop, trap nest, dog kennel, tool handles, whiffle-trees, double-trees, wagon jack, feed hoppers, cold frame, wheelbarrow, saw bench, ladder, window boxes, split log drag, etc.

Preparation and reading of plans and elevation of farm buildings; construction of the simpler buildings such as hen house, pig pen.

- (2) Plans and specifications for a farm mechanics building to be erected on the school grounds, or for the adaption of a portable garage or of another building for this purpose.

- (3) Simple metal work; the hand forge and the forge fire; use and care of the commoner tools; the making of simple objects such as stables, hooks, latches, chains, etc.

- (4) General care and repair of farm buildings and implements; windows, fences, gates, machinery, painting, etc.

- (5) Repairing harness, rope knotting and splicing.

(6) Simple concrete construction; proper mixtures for various purposes; making of fence posts, walks, troughs, etc.

The course is open only to those teachers who hold intermediate cer-

tificate in agriculture or are in course of preparation for such certificate. Ten candidates took the course this year. This is the first year the course was provided.

MANITOBA

BY R. FLETCHER, DEPUTY MINISTER OF EDUCATION.

Six men and one woman entered upon the special course for teachers at the Agricultural College leading to the degree of B.S.A. this summer. Students who complete three summer courses will be qualified to enter the fourth year of the regular B.S.A. course. They must hold a second-class or first-class professional teacher's certificate in order to take this course.

A summer course leading to a certificate to teach Household Science in the elementary schools was started this summer at the Agricultural College. Students entering this course are required to hold second class or first-class professional certificates, and the course covers three summer terms of six weeks each. Seven young ladies started on this course.

SASKATCHEWAN

BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

The Summer School for teachers which commenced at the University of Saskatchewan, Saskatoon, on July 4, closed on Friday, August 10.

On Thursday, August 9, an exhibition of some of the work of the students was held in the Convocation Hall, when the results of the labours of the students in art, manual art, sewing, cooking and nature study were tastefully exhibited. In the evening about 100 teachers, with the members of the staff of the Summer School and a few friends, sat down to an informal banquet in the University dining hall. Speeches were delivered by President Murray, Dean Rutherford, Prof. Hogg, Miss Twiss, Miss Rankin, and several of the students.

In previous years the Summer School has been under the direction of the Department of Education, but this year the University took over the responsibility.

The Department of Education

again paid the return railway fare of those teachers who satisfactorily completed a course leading to a diploma, and will award diplomas to teachers who have satisfactorily completed two years' work in any one of the following subjects: Agriculture, elementary science and agriculture, household science, manual training, art.

In addition to courses leading to a diploma, the University for the first time offered a number of short courses, on the satisfactory completion of which teachers will receive credit towards a degree. This year such courses commenced on July 10 and were offered in physics, cereal husbandry and animal husbandry. A few teachers took advantage of this special opportunity.

Accommodation for all registered students of the Summer School was provided at the University at the rate of \$35.00 for the six weeks, or \$1.00 a day for periods of less than

five weeks. Extra charges were made for single rooms, and a fee of \$1.50 was charged all students for laboratory materials, breakages, etc.

COURSE OF STUDY.

A complete course for a diploma consists of two years' work. Nature study and school gardening of the first year is common to all courses. At least one other subject must be taken during the first year.

First Year Subjects:

Nature study, 1, 2.
School gardening, 1, 2.
Household science, 1, 2, 3.
Elementary art, 1.
Manual art, 1, 2, 3.

- a. Educational value of school gardening.
 - b. Forms of garden work; methods.
 - c. Correlation with other subjects.
- 2.—Laboratory and Practical Work:
- a. Preparation, seeding and care of plots.
 - b. Preparation of hot beds, transplanting, etc.
 - c. School garden plans and records.

Nature Study:

- 1—Lectures and Discussion:
 - a. Its meaning and place on the school programme.
 - b. Its relation to other subjects; methods.
- 2—Laboratory and Practical Work:
 - a. Preparation of equipment needed.
 - b. Excursions for observation and study.
 - c. Collecting and mounting of specimens.



THE SUMMER SCHOOL GARDENING CLASS, SASKATCHEWAN, 1917

Second Year Subjects.

Agriculture, 1, 2, 3, 4, 5, 6, 7, 8, or
Household science, 4, 5, 6, or
Elementary science, 1, 2, 3, and agricul-
ture, 1, 2, 7, or
Manual training, 4, 5, 6, or
Art, 1, 2, 3.

Special provision for instruction in music and in physical training and folk dancing was made for teachers who were desirous of taking these subjects.

The time table was arranged so that only five hours per day were devoted to the regular work of any course. Special work was taken at other times.

DETAIL OF SUBJECTS.

School Gardening—

- 1—Lectures and Discussion:

Agriculture:

- 1 Natural History:
 - a. Common wild animals in relation to agriculture.
 - b. Birds and insect life in relation to agriculture.
- 2—Weeds and Their Control:
 - a. The Noxious Weeds Act.
 - b. Detail study of weeds and weed seeds; identification.
- 3—History of Agriculture:
 - a. An introduction to the study of agriculture.
- 4—Farm Animals.
- 5—Crop Production.
- 6—Farm Implements.
- 7—Forestry and Small Fruits.
- 8—Farm Management:
 - A study of the principles underlying the management of prairie farms.

Household Science:

Equipment.—Teachers will provide themselves with plain white aprons for laboratory work.

1—Foods and Their Preparation:

- a. Discussion of class organization and equipment.
- b. Instruction in the scientific principles of combustion.
- c. Construction and care of coal range.
- d. Cost and efficiency of various fuels.
- e. Food and its relation to the body.
- f. Classification of foods.
- g. Effects of heat on food materials; how applied.
- h. Laboratory work in preparation and cooking of fruits, vegetables and cereals.
- i. Special attention will be given to the best methods of conducting the noon lunch in rural schools and practice will be given in the preparation of suitable dishes for same.

2—Sewing:

- a. Meaning of terms; use of tools, materials, etc.
- b. Stitch forms, basting, running, overcasting, hemming, overhanding, seams, finish of seams, button holes, sewing on buttons, hooks and eyes.
- c. Study of cloth; kinds, ways of cutting, edges, folds and hems.
- d. Repair of clothing, hemmed and overhanded patch, darning in cloth and stocking.

3—Household management:

- a. Care of the house; study of the cleansing agents.
- b. Homecraft in the class room.
- c. Hygiene of the school child; personal body cleanliness; care of teeth; rest and exercise; clothing.
- d. First aid to the injured as prescribed by the St. John Ambulance Association. A course in home nursing will be provided for those who are granted certificates in first aid.

4—Foods and their preparation—Advanced work:

- a. Detail study of classification of foods.
- b. Function of each food group in the body.
- c. Digestion, mouth, stomach, intestines.
- d. Movement of food along the digestive tract.
- e. Chemical changes; absorption, excretion.
- f. Nutritive value of food.
- g. The balanced meal; the invalid's tray.
- h. The lunch box and the supplementary hot dish.
- i. Home project work and school fairs.

- j. Laboratory work in the preparation and cooking of eggs, milk, cheese and meats; practice in the planning and serving of simple meals and of the noon day lunch.

5—Sewing—Advanced Work:

- a. A continuation of sewing—Course 2 (b) seams—plain, French, fell; hems—plain and fancy.
- b. Care and use of sewing machine.
- c. Use of patterns in the making of garments.
- d. Study of textiles; microscopic examination of fibres, household tests for adulteration of fibres.
- e. Methods and courses for school work.

6—Household Management—Advanced:

- a. The evolution of the home; the house, site, planning and furnishing.
- b. Plumbing, water supply, disposal of waste.
- c. Care of water supply and milk supply, control of pests, food laws.
- d. Survey of rural school conditions.
- e. Home nursing. Care of the sick; the sick room; bed making; simple bandaging.

Manual Training:

1—Modelling:

- a. Simple modelling as outlined for the public school course of study.

2—Paper and Cardboard Construction:

- a. Paper tearing, folding and cutting.
- b. Border designs and geometrical figures.
- c. Illustration of games, etc.

3—Basketwork:

- a. Simple basketry as outlined for the public school course of study.

4—Woodwork:

- a. Tools, their uses, care and maintenance.
- b. Woods, their nature, treatments, shrinkage, cutting and finishing.
- c. Construction details of shopwork.

5—Drawing:

- a. Mechanical drawing of objects to be made.
- b. Lettering.
- c. Perspective drawing.

6—Practical woodwork:

- The making, painting and finishing of selected articles.

Elementary Science:

- 1—Biology
- 2—Chemistry.
- 3—Physics.

Art.

1—Elementary Art:

- An attempt to give some idea regarding the Art work of the public school course of study.

2 and 3—Pictorial representation. Design.

SUMMARY OF ATTENDANCE

Course.	Male	Female	Total	Recommended to Receive Credit for One Year.
FIRST YEAR:				
Nature study and school gardening .	4	25	29	29
Household science.	-	19	19	16
Art.	3	20	23	20
Art (first year and advanced) .	1	5	6	6
Partial course	-	8	8	-
Total	8*	77*	85*	71*
SECOND YEAR:				Recommended for Diploma.
Agriculture.	5	5	10	9
Agriculture and science	14	6	20	19
Household science.	-	7	7	7
Manual training.	4	2	6	5
Total	23	20	43	40
Physical training	1	6	7	
Special work (not included in the above)	-	11	11	
Grand total	32*	114*	146*	111*

*As several teachers were enrolled in more than one of the first year and physical training courses these totals refer only to enrolment. The total number of students attending the school was 97, of which 28 were men and 69 women.

ALBERTA

BY JAS. C. MILLER, B.Sc., Ph.D., PROVINCIAL DIRECTOR OF TECHNICAL EDUCATION

THE people of Canada should realize that one of the vital services of the present moment for the nation, is that of providing the boys and girls of the present with the best possible preparation to meet the problems they will have to face as they grow to maturity and take our places in positions of responsibility and of service. In the stress and strain of the present great struggle we must not lose sight of the situation these young people will have to meet in the future. They will have to meet it, either successfully or otherwise, for they cannot avoid it. It is our responsibility to see that nothing is left undone which will make them more efficient, more alert, more imbued with high ideals and noble purposes, and at the same time equipped with the technical knowledge and the methods to give

effect to such noble purposes, to the end that progress be made toward the high ideals conceived

It is the realization of the special significance of the education of the children of the present generation which has led the Department of Education to continue the summer school for teachers which has been held annually for the past five years. Its purpose is to assist the alert and progressive teachers to improve her qualification to render more effective service in fitting the children to meet life as they will have to meet it. In spite of the special conditions of the time and the many other calls, the teachers responded splendidly, over three hundred being in attendance. A staff of over twenty-five specialists was needed to care for the programme of instruction. Fifty-one different classes met daily. The

usual courses were offered in each of the following subjects: nature study, agriculture, biology, botany, zoology, physics, chemistry, household arts, household science and dietetics, household management, art methods, drawing and painting, design, mechanical drawing, woodwork, manual arts, physical training, folk-dancing, first aid, home nursing.

This year, a special short normal course was provided for qualified teachers from Great Britain and the United States for the purpose of giving them the supplementary instruction needed, to enable them to fit more easily into the school work

One of the distinctive features of the Alberta summer school is its sociability and the "school spirit" among the students. The "spirit" of the school seems to energize everyone and to bring them into close comradeship in work and in play. The student organizations were all under way in their various enterprises before the end of the first week. The Red Cross circle was able to raise over \$400 in cash, besides many articles involving knitting and sewing for the Red Cross society. The Student's Orchestra and the Glee Club were successfully developed this year, for the first time. Their



A GROUP AT THE SUMMER SCHOOL FOR TEACHERS, UNIVERSITY OF ALBERTA, 1917

of the province. A group of twenty-five teachers was added to the provincial teaching staff in this way. Fifteen young teachers qualified for the physical instructor's certificate under the Department of Militia, over fifty teachers qualified for first aid or home nursing certificates under the St. John's Ambulance Society. The latter is an especially valuable qualification, especially for teachers in rural districts. The courses most favoured, however, were those in agriculture, nature study, household arts and art.

contributions on social evenings and their entertainment of the soldiers in the Convalescent Home and Military Hospital were much appreciated.

The Minister of Education, at the closing function, intimated that the success of the school had been such as to justify plans for an expansion of its programme of work so as to enable it to render service to an even wider range of interests. No doubt the time will come when all phases of the educational problem will receive attention at the summer school.

BRITISH COLUMBIA

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THE British Columbia Summer School for Teachers was held in Victoria from July 3rd to August 3rd. It was attended by 243 teachers (70 men and 173 women). Six courses were offered: rural science, art, manual training, manual arts, household economics and vocal music and elocution. The classes were considerably smaller than in previous years, which fact made it possible to organize the work more

meeting. Lectures of a literary and scientific character were given by prominent lecturers, each programme providing also for a few choice musical selections. These evenings were attended by many outsiders and were much enjoyed.

The course in rural science, including agriculture, nature study and school gardening, was conducted along lines similar to those adopted at former summer schools. This

year frequent use was made of street-cars, suburban trolley and steam lines and motor busses. We are fortunate in Victoria in being so situated that practically every branch of agriculture and horticulture can be studied at first hand in connection with "going concerns" within a few minutes' ride of the High School, the headquarters for the summer school. Consequently, a large number of classes were conducted on farms, poultry ranches, gardens and orchards in the immediate vicinity of Victoria. The proprietors and managers of these places were most enthu-



VICTORIA SUMMER SCHOOL, CLASS IN STOCK JUDGING

carefully and, generally, to improve the courses. The instructors, most of whom took part in the summer schools held in previous years, all seemed to agree that the work done this year was somewhat in advance of that previously accomplished. In addition to the regular courses special classes in "First Aid to the Injured" and "Home Nursing" were conducted under the management of the local branch of the St. John's Ambulance Association. Eighty-two of the student-teachers were enrolled in these special courses. One evening each week was devoted to a special open

meeting. Lectures of a literary and scientific character were given by prominent lecturers, each programme providing also for a few choice musical selections. These evenings were attended by many outsiders and were much enjoyed.

The course in rural science, including agriculture, nature study and school gardening, was conducted along lines similar to those adopted at former summer schools. This year frequent use was made of street-cars, suburban trolley and steam lines and motor busses. We are fortunate in Victoria in being so situated that practically every branch of agriculture and horticulture can be studied at first hand in connection with "going concerns" within a few minutes' ride of the High School, the headquarters for the summer school. Consequently, a large number of classes were conducted on farms, poultry ranches, gardens and orchards in the immediate vicinity of Victoria. The proprietors and managers of these places were most enthu-

interest in school grounds improvement,—a work which this province is pursuing with success.

SUBJECTS AND INSTRUCTORS

Following is a list of the subjects and instructors in rural science at the summer school:—

Mr. J. W. Gibson, M.A., Director of Elementary Agricultural Education: Organization and Methods in Rural Science (preliminary and advanced course).

J. A. McLean, B.S.A., Professor of Animal Husbandry, University of British Columbia: Animal Husbandry and Dairying (preliminary course); Live Stock—Feeding, Care and Management (advanced course).

School Gardening and Special Floriculture (advanced course).

A. H. Hutchinson, M.A., Ph.D., Professor of Botany, University of British Columbia; Plant Study (preliminary and advanced courses).

H. B. MacLean, Provincial Normal School, Vancouver, B.C.; School Gardening and Special Floriculture (preliminary and advanced courses).

J. W. Eastham, B.Sc., Plant Pathologist, Vancouver, B.C.; Plant Study (preliminary and advanced courses).

T. A. F. Wiancko, Dairy Instructor, Victoria: Animal Husbandry and Dairying (preliminary course).

H. E. Upton, Poultry Instructor, Victoria: Poultry Keeping (preliminary course).

W. B. Anderson, Victoria: Bird Study (preliminary course).

J. R. Terry, Chief Poultry Instructor, Victoria: Poultry Keeping (advanced course).



RURAL SCIENCE STUDENTS AT WORK, NORMAL SCHOOL, VANCOUVER, 1917

F. M. Clement, B.S.A., Professor of Horticulture, University of British Columbia: Horticulture and Floriculture (Preliminary and advanced courses).

P. A. Boving, B.A., Professor of Agronomy, University of British Columbia: Soil Fertility (advanced course).

R. C. Treherne, B.S.A., Entomologist for the Dominion Government: Entomology (preliminary and advanced courses).

J. C. Readey, B.S.A., District Supervisor of Agricultural Instruction, Chilliwack, B.A.: Soil Studies (preliminary course); Field Husbandry (preliminary course); Field Husbandry and Farm Management (advanced course).

E. L. Small, B.S.A., District Supervisor of Agricultural Instruction, Cloverdale, B. C.; Field Husbandry (preliminary course); Field Husbandry and Farm Management (advanced course).

J. E. Britton, B.S.A., District Supervisor of Agricultural Instruction, Armstrong, B.C.; Horticulture (preliminary course);

F. Dundas Todd, Inspector of Apiaries, Victoria: Bee Keeping (advanced course).

E. Blackmore, Victoria: Entomology (advanced course).

Special lectures were given by Dean Klinck, of the Faculty of Agriculture, in the University of British Columbia, dealing with "The Country Life Problem;" by Prof. W. T. MacDonald, Provincial Live Stock Commissioner, on "Bovine Tuberculosis and Public Health;" by Prof. L. Stevenson, Superintendent, Experimental Farm, Sidney, B.C., on "The Production of Home-grown Bulbs and Garden Seeds"; and by Mr. Tothill of the Dominion Department of Agriculture, on "Parasitism Amongst Insects."

RURAL SCHOOL CONSOLIDATION

At the ninth convention of the Dominion Education Association held at Ottawa last winter the consolidation of rural schools was discussed. The following extracts are taken from the report of that conference:

PRINCE EDWARD ISLAND

BY THEODORE ROSS, B.A., SECRETARY-TREASURER

We have done quite a lot in the way of consolidating small schools; that is, where we have ten or fifteen pupils the school has been closed and the children hauled to the neighbouring school. The Government pays a sum equal to the allow-

ance of the teacher for the carrying of the children. We have a good many cases of consolidation of that kind. We have no big consolidated school at present such as are in Manitoba and New Brunswick and some other provinces.

NOVA SCOTIA

BY A. H. MCKAY, B.A., LL.D., SUPERINTENDENT OF EDUCATION

We have from 40 to 50 consolidations already started, all due to the object-lesson given by the Macdonald School at Middleton. That process has not yet ended. There is on the Statute Books a large grant which has not yet been half expended, allowing us in the case of consolidation to grant as much as \$250 for every school section coming in, for the purpose of building up a central school. That is a pure gain to the local section. It will not get anything if it builds only for itself. That is one contribution for the school house, so that they would get \$1,000 if four schools were consolidated into one. Then again, we might get along with fewer teachers and still have more or less of a

graded system, and some money might be saved in that way. The province promises to give as an extra grant whatever is saved from the grants given to the uniting schools. No matter how poor each school is, the Provincial Aid from the treasury is just as large whether a teacher has only two pupils or sixty in his school; so that is considerable aid to a poor school section. Whenever things take a turn in any particular settlement, and the proper man comes to the school to lead, we find new consolidations, smaller or larger, projected, and that has stopped breaking up the larger sections into smaller sections which was very prevalent before this movement commenced.

NEW BRUNSWICK

BY W. S. CARTER, M.A., LL.D., CHIEF SUPERINTENDENT OF EDUCATION

In regard to Consolidation, the pioneer school (The Macdonald Illustration Consolidated School) is still flourishing, and the number has been added to, in addition to many smaller schemes in the same direction which are doing much good. The most important benefit in this connection has been the education of public sentiment. To-day we can get vocational training, school gardening, and we can in any district

find some support for consolidation. We had at one time parish school boards, but unfortunately at the inception of the present school law we were unwise enough to abolish them for district school boards. If we could make every district a central district of consolidation I am confident we could get any number of them; but the desire for local autonomy is so great that it stands as a bar to consolidation.

ALBERTA

BY D. S. MACKENZIE, Ph.D., DEPUTY MINISTER OF EDUCATION

It has been found, after travelling through all the provinces of Canada and some of the United States, that local conditions suitable in one part would not apply to another, and the local conditions in Alberta must be considered. In the past two or three years we have organized some 30 consolidations. The policy of the Department of Education is not to convince people as to consolidation, but to send information and representatives to any community wishing

to consider the question, and free discussion has taken place between educationists and school boards. We wish every community to be perfectly satisfied that they want consolidation and are prepared to pay for it before it is given. The result is that it is carried with the enlightened votes of the people. A large number of our consolidations are not yet opened, but they are opening and we expect big things.

Though the Exhibition season is not yet over, we have gone far enough to know that we have beaten our good record of previous years. Our "Greater Production" movement of last spring has certainly borne fruit, or rather, vegetables. Not only have more schools exhibited, but the quality of the exhibits is much better than ever before. We are grateful to the teachers who have so ably co-operated to bring such good results.—L. A. DeWofle, M.Sc., in *Rural Science Bulletin* for October.

ONTARIO

SHORT COURSES IN DOMESTIC SCIENCE

THE Department of Agriculture has arranged through the Superintendent of Women's Institutes for the institutes to hold during the autumn and winter a series of short courses, each consisting of ten lectures, accompanied by demonstrations in domestic science (food values and cooking); home nursery and first aid and sewing. In many of the counties where District Representatives are located these courses will be held at the same time and place as courses are being given in agriculture to men and boys. Institutes are required to forward applications to the Superintendent to make arrangements for holding the courses, to provide a well-lighted and properly heated room, to guarantee classes in domestic science, home nursing and first aid, the minimum of students being 20, and sewing, the number of pupils being from 15 to 18, and to provide table and stove (gas or oil) for domestic science, and tables and three or four machines for sewing. The Department will send instructors who will be provided with the necessities for lessons in home nursing and first aid. For the privilege of attending the courses a fee of 25 cents is to be charged to members of the institutes and 50 cents to non-members, who on paying the fee become members. A dollar extra is to be charged each member of the sewing class. Instruction will be given five days a week for two weeks, as a rule in the afternoon, beginning any time from 1.30 to 2.30. In exceptional cases other arrangements can be made.

THE PROGRAMME

The programme of lessons arranged is as follows:—

Domestic Science.

(Food values and cooking).

Lesson.

- No.1. Vegetables—fresh, starchy and dried, Special food functions and methods of cooking.
- " 2. Fruit—Typical methods of cooking; combinations making the best use of home-grown fruits.
- " 3. Canning of vegetables, fruits and meats.
- " 4. Milk—Soups, puddings and combinations, with special relation to infant, children's and invalid diet.
- " 5. Cereals and Cheese—Various methods of cooking; their high food value compared with other more expensive foods.
- " 6. Meat—Roasting and broiling; braised dishes, stews, and soups; uses of the different cuts, and food value compared with other foods. Menus planned to save beef and bacon.
- " 7. Meat Substitutes—Fish, Eggs, Legumes.
- " 8. War Breads, Biscuits, etc.
- " 9. Simple Desserts.
- " 10. Salads.

The instructor may substitute other lines of work for one or two of the lessons announced if thought desirable.

The institute must provide a helper to assist the demonstrator in preparing for the classes and in cleaning up after the demonstration.

Home Nursing and First Aid

Throughout the course the pupils will have practical work in reading the clinical thermometer, counting pulse and respirations. The keeping of a chart will be also taken up; this consists in keeping a simple exact record of the various things mentioned thereon.

List of demonstration-lectures in home nursing:—

1. Sick Room—Sanitation, ventilation, care, etc.

2. Bed-making for Various Forms of Sickness.
3. The Bath.
4. Emergencies.
5. Hot and Cold Applications.
6. Bandaging.
7. Disinfectants and Observations of Symptoms.
8. The Administrations of Food and Medicine.
9. Baby Hygiene.
10. Review and General Discussion.

The instructor and members of the class may substitute other subjects for two or three of the lessons announced.

If the institute members so desire, the instructor will give a few special talks or lessons to the older girls in the school as well as other young girls of the neighbourhood.

Sewing.

The sewing course will consist of ten lectures, as follows:—

- Two lessons on plain and fancy stitches, including button-holes and eyelets.
- Two lessons on tailored skirt.
- One lesson drafting and cutting.
- Three lessons on one-piece dress—fancy.
- Two lessons on one-piece dress—plain.

This course may be changed by arrangement with the instructor concerned.

Each pupil must supply a notebook, one 12-inch rule, one spool white cotton, 60, one spool white cotton, 40, one paper needles No. 7, long, sharp and a small pincushion well filled with pins, scissors thimble.

SCHOOL GROUND IMPROVEMENT

THE result of the work of an energetic rural science teacher in Renfrew county, Ontario, is shown in the four views accompanying this article. The first view, Fig. No. 1, shows the bare surroundings of the school before any improvement of the grounds had been undertaken. It represents the condition of vastly too many rural schools throughout Canada. Fig.

No. 2 shows the conditions one year later. The improvement effected was brought about by the teacher securing the sympathetic co-operation of the trustees and other rate-payers. Fig. No. 3 shows the farmers' sons and others who have gathered with their teams to clear the ground of stones, logs, weeds and rubbish, to haul in good earth and manure and plow the soil for



FIG. 1. THE SCHOOL GROUNDS BEFORE IMPROVED

spring planting. Fig. No. 4 shows a section of the garden in the autumn of the second year. The photograph was taken after the early vegetables had been removed. The following spring a number of the

rural science teacher exhaust itself in her school gardening work. After the grounds had been improved a school picnic was held, which was attended by the District Representative, several clergymen, visiting

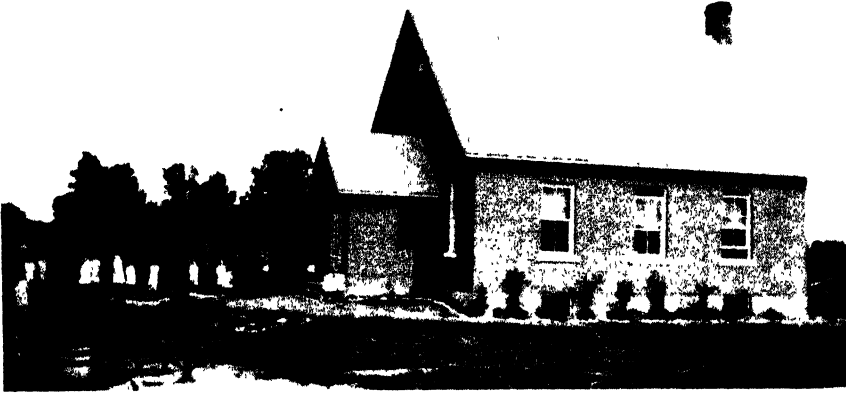


FIG. 2. CONDITION ONE YEAR LATER

ratepayers again returned with their teams to do further work, including the planting of perennials, maples and evergreens, the latter to form screens for the outhouses.

Nor did the enthusiasm of this

teachers and more than 300 people of the district. The programme carried out consisted of awarding prizes for garden plots, the holding of races and other athletic competitions, and a discussion of the school



FIG. 3. PREPARING TO CLEAR THE GROUNDS FOR CULTIVATION

work. The women of the section provided the picnic supper. That was in the month of June. On Trafalgar day a harvest home festival was held, to which the parents of the children were invited. The children exhibited the products of their gardens. The programme for the occasion was made up and carried out by

the officers and committee of the School Progress Club. This school possesses a Girls' Sewing Club. The teacher reports that the agricultural work accomplished by the pupils in no way retards, but to a large extent increases the interest and value of the work in all branches of the school.



FIG. 4. SECTION OF GARDEN IN AUTUMN OF SECOND YEAR

PRINCIPAL OF SCHOOL OF HOUSEHOLD SCIENCE RESIGNS

Miss Katherine A. Fisher has resigned as head of the School of Household Science at Macdonald College, to accept a position in

Household Science at Columbia University. Miss Anita E. Hill has been appointed temporarily to fill the position vacated by Miss Fisher.

PART IV

Special Contributions, Reports of Agricultural Organizations, Notes and Publications

ELEVATOR SCREENINGS AVAILABLE FOR STOCK FEEDING

ON September 18th an Order-in-Council was passed prohibiting the exportation, except under license, of screenings produced in cleaning wheat and other grains to all destinations abroad, other than the United Kingdom, British Possessions and Protectorates. This was a preliminary movement put in force merely to regulate matters until a satisfactory scheme could be evolved whereby the stock feeders and poultry raisers of Canada could have made available to them for feeding purposes, the large quantities of screenings that have, year by year, been shipped out of the country. As a further step, the Honourable Martin Burrell, Minister of Agriculture, called a conference in Winnipeg, which took place on September 25th. This meeting was attended by representatives of the Federal Department of Agriculture, of the Departments of Agriculture of the prairie provinces, officers of the Grain Growers' Associations, Elevator Companies, Live Stock Associations, the Grain Exchange, the Canada Grain Commission and the Railway Companies.

After a full discussion of the whole question, a committee was appointed to work out a plan and to recommend it to the Minister of Agriculture for Canada, with a view to securing the desired results. This committee, which met on the following day, consisted of Messrs. H. S. Arkell, Acting Live Stock Commissioner; Geo. H. Clark, Seed Commissioner; W. J. Black, Agricultural Instruction Act Commissioner; W. B. Lanigan, representing the railways; F. H. Auld, Deputy Minister of Agriculture for Saskatchewan and J. D.

McGregor, representing the live stock interests; J. A. Maharg and F. Collier, representing the Grain Growers' Associations; J. B. Jones, representing the Canada Board of Grain Commissioners; and R. P. Dobell, representing the terminal elevators.

An agreement was reached by this committee, embodying concessions on the part of the railway companies, the Interior Elevator Companies and the Board of Grain Commissioners for Canada. The meeting accepted the recommendations of the representatives of the railways whereby screenings suitable for feeding purposes would be made available through the medium of the Government Interior Terminal Elevators. Grain consigned to these terminal elevators at Calgary, Moose Jaw and Saskatoon for immediate cleaning and re-shipment, it was agreed, would be subject to a "stop-over" charge of two dollars per car; that the screenings resulting therefrom would be carried from these elevators to destinations, either Fort William or West at the balance of the through rate from the point of origin when accumulated and re-shipped in car lots; that the grain so cleaned would be permitted "stop-over" for milling in transit at intermediate points for an additional charge of one cent per hundred pounds and re-shipments at the balance of the through rate from the point of origin.

The committee accepted the proposal of the representative of the Canada Grain Commission to facilitate the movement of grain consigned to the interior elevators to point of destination in every possible manner as well as to separate and grind, if desired, the screenings produced in a man-

In case the supply of grain screenings from Interior Terminal elevators, resulting from these arrangements should prove inadequate for western stock men, the railways agreed to extend their present tariff from lake front terminal elevators to all western feeding points. The standard screenings accumulated by the Government Terminal Elevator at Port Arthur will be available for Eastern requirements. Should the supply prove inadequate, it was agreed by the representative of the Terminal Elevator interests that these terminals would use their present equipment to the best possible advantage to separate screenings to standard taking equal care of orders from stock men and feeders east and west for the standard screenings in preference to exporting them, always provided that an equivalent ner satisfactory for stock feeding purposes.

price is tendered on an equal basis to what can be obtained in the open market.

In regard to the classification of screenings, it was recommended that Mr. Geo. H. Clark, Dominion Seed Commissioner, and Mr. J. B. Jones of the Canada Board of Grain Commissioners, should decide what classification should be made of elevator screenings. As a result of the deliberations of these officials a standard will be worked out and determined.

The committee was assured by Mr. H. S. Arkell, that the Live Stock Branch would continue the campaign of publicity they have been pursuing, as approved by the Minister, regarding the value and availability of the separated screenings as afod for live stock. The Branch will also continue to assist in the proper distribution of the screenings.

JUNIOR FARMERS' JUDGING COMPETITION

AT the Canadian National Exhibition this year a new competition was held in judging by farmers or farmers' sons under 26 years of age. The competition was held under the supervision of the Ontario Department of Agriculture. It was not open to graduates of the agricultural colleges. Classes were provided for heavy horses, beef cattle, dairy cattle, sheep, swine, poultry, grain and roots, fruits and vegetables. Contestants were allowed to enter in one class of stock including poultry and including vegetables or grain and roots. Sixteen prizes were offered in each section running from \$20 for first to \$5 for sixteenth for live stock and \$15 for first and 50c. for sixteenth for poultry, grains and roots, fruits and vegetables. The Department of Agriculture supplied the judges and the Exhibition Association selected the animals and other classes to be judged. The prizes were awarded on the basis of fifty points for placing and fifty points for judging. Twen-

ty-five minutes was allowed for placing the awards and giving the reasons. The competition proved of great educational value.

Following are the number of entries in each of the respective classes

Horses.....	43
Beef cattle.....	46
Dairy cattle.....	42
Swine.....	14
Shep.....	13
Poultry.....	9
Grain and roots ..	86
Fruits and vegetables.....	11

At the Central Canada Exhibition a similar competition was held for the judging of live tock. The entries in the various classes were as follows:

Horses.....	45
Beef cattle.....	45
Dairy cattle.....	53
Sheep.....	36
Swine.....	45

AGRICULTURAL INSTRUCTION AT THE CANADIAN NATIONAL EXHIBITION

WHILE the Canadian National Exhibition, with others of its kind, may be regarded as a vast educational institution, there are features of this great annual event that are designed to teach the same lessons as the agricultural colleges and departmental branches of agriculture. The Dominion Government building is set apart chiefly for this class of exhibits. The Dominion, Ontario and Alberta Governments were represented in this building.

The exhibits of the Department of Agriculture of Canada were made by the Live Stock Branch, the Experimental Farms and the Health of Animals Branch.

The Live Stock Branch exhibit consisted of a display of wool and embraced many phases of the sheep raising industry and the manufacture of woollen materials. It occupied an entire wing of the building, having 5,800 square feet of floor space. The exhibit embodied samples of practically all classes, qualities and conditions of wool. Large photographs of sheep of the various breeds and classes of interest to the Canadian sheep raiser, examples of woollen fabrics of many descriptions, ancient and modern weaving machinery in operation, and models of sheep barns, racks, dipping vats, and other equipment samples of suitable sheep feeds, and many other instructive features, all so arranged as to arouse the interest and thought of the thousands that daily visited the demonstration.

The demonstration of the Experimental Farms was devoted to the work of the Fibre Division created last year. It included samples of flax of different varieties and qualities and of hemp produced at the Experimental Farms. These plants were shown in their original condition and in the various stages of manufacture. The products shown included, twine, fabrics of many descriptions, seed and oil. A feature of special interest consisted of samples of flax fibre retted by the dew and water methods. The exhibit showed the character of the work of the Fibre Division and emphasized the importance of the flax industry to Canadian agriculture.

The Health of Animals Branch display consisted chiefly of pathological specimens arranged to show the conditions that are found in healthy meats and such of those diseased meats as are condemned by the meat inspection officers of the branch. A feature of the exhibit that attracted special attention was an approved and a condemned ham, lying side by side. These, to all appearance, were equally healthy. The reason for the condemnation was ex-

plained in sections of the glands taken from each of the hogs represented, the one healthy and the other diseased. The exhibit was designed to impress upon the public the importance of purchasing only such meats as bear the "Canada Approved" stamp.

ONTARIO EXHIBITS

The Department of Agriculture of the province of Ontario was represented in a number of exhibits. The Agricultural College booth presented illustrations in the form of charts, photographs and samples of crops so arranged and displayed as to show clearly the advantages of growing only the best varieties according to the most approved methods. The work of the Department of Physics was represented in demonstrations of land drainage, protection against lightening and the disposal of sewage.

The exhibit of the College Dairy Department, which was presented in the dairy building, sought to prove the value of keeping only tested and proved cows and of proper methods of handling the milk. Photographs of cows that appeared equally good, were shown. The records also displayed, proved one to have made a good profit on food consumed while the other was fed at a considerable loss. The difference was shown in piles of pound prints of butter representing the amounts yielded weekly by each of the cows. The importance of cleanliness was emphasized by deposits of sediment of varying quantities caught in filters through which the milk had been strained. Other useful lessons were effectively taught.

The importance of trap-nesting was a prominent lesson brought out in the Poultry Department booth. A hen that had laid more than two hundred eggs in a year was displayed side by side with two others equally good in appearance, that had laid only a few eggs each. The results of using different feed mixtures, which were exhibited, were shown in the form of representative baskets of eggs.

Those interested in swine raising were shown the best types of hogs to raise and the best foods and mixtures to use which included milk, tankage, shorts and coarse grains.

The Fruit Division displayed quantities of plums, pears, apples and other fruits and distributed literature covering the culture of all classes of fruits with special instructions for combatting insect and fungus enemies. There were also shown specimen packages of canned peaches and jams of which the Ontario Department put up and

sent to the Canadian Military Hospitals 60,000 gallons of the former and 80 tons of the latter.

The work of the Agricultural Societies Branch was shown in a beautifully arranged collection of grains in the sheaf and in bags representing the Field Crop Competition and of vegetable crops grown by members of the Ontario Vegetable Growers' Association. A display of a similar character represented the crops grown by the Ontario Department of Lands, Forests and Mines on the several industrial farms.

The lessons desired to be impressed by the Women's Institute Branch were those of thrift. Specimens of various foods in such quantities as may be purchased for a given sum were shown side by side with information giving the actual food values of the different substances. Demonstrations in canning and preserving were also made each day.

A MOTION PICTURE EXHIBIT

A new departure of the Ontario Government was represented in another building. It consisted of a continuous motion picture display and included scenes showing methods of preventing and combatting forest fires, shearing sheep and handling wool, outward indications of profitable cows, the story of the bacon hog, and other practical topics that influence the welfare of the country. The pictures were made by a small portable machine that may be used in small or large buildings in any part of the country.

THE ALBERTA DEMONSTRATION

The only other province that made an agricultural educational exhibit was Alberta. It consisted of an attractive display of excellent specimens of various field crops common to the province and of representations of the dairying industry in the form of designs modelled in butter.

RELIEF FOR BELGIAN POULTRY RAISERS

At the Canadian National Exhibition at Toronto there was held on Labour Day an auction sale of pure-bred poultry contributed by poultry raisers in Ontario and Quebec to provide relief for poultry farmers in Belgium who had suffered the des-

truction of their property by the war. The contributions for this sale numbered about 70 in ones and twos and included most of the useful breeds. The sale realized about \$200.

ASSOCIATIONS AND SOCIETIES

THE UNITED GRAIN GROWERS

Amalgamation between the Grain Growers' Grain Company of Winnipeg and the Alberta Farmers' Co-operative Elevator Company of Calgary came into force on September 1st under the title of the United Grain Growers, Limited. The new com-

pany possesses 300 elevators and has 35,000 shareholders. Mr. T. A. Crerar, Winnipeg, is president; Mr. C. Rice Jones, Calgary, first vice-president; and Mr. John Kennedy, Winnipeg, second vice-president.

SALE OF ALBERTA PROVINCIAL SHEEP AND SWINE BREEDERS' ASSOCIATIONS

The Alberta Provincial Sheep and Swine Breeders' Association will hold a public sale of sheep and swine at the exhibition grounds, Edmonton, on November 2nd. The sheep and swine to be sold must be those owned by members of the Sheep and Swine Breeders' Association, but, in the case of the sheep, entries of a limited number from reputable breeders outside the province of Alberta will be accepted if they are deemed necessary for the success of the sale. The number of animals to be offered will be limited to 150 head of sheep and 75 head of swine. An entry fee of

50 cents will be charged for each animal entered in this sale. The association undertake to pay one-half the freight and switching charges, or, in the case of individual animals, one-half the express charges of animals purchased at the sale and shipped to points in the province of Alberta. On the morning of the sale the animals will be judged and awards of first, second, third and champion prizes made. The secretary of the Alberta Provincial Sheep and Swine Breeders' Association is W. J. Stark, Edmonton.

THE ENTOMOLOGICAL SOCIETY OF ONTARIO

The fifty-fourth annual meeting of the Entomological Society of Ontario will be held at Macdonald College on November

8th and 9th. The Secretary of the Association. Mr. A. W. Baker, O.A.C., Guelph, Ont.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT
OF AGRICULTURETHE DOMINION EXPERIMENTAL
FARMS

THE DIVISION OF HORTICULTURE

Digging and Storing of Potatoes, by W. T. Macoun, Dominion Horticulturist. A timely and very informative four-page leaflet has been issued by the Dominion Experimental Farms. Mr. Macoun after telling how and when potatoes should be dug, in precise and plain language explains how they can best be kept either for a brief space or for a season. His suggestion of co-operation in storing should appeal to dwellers in cities and towns.

THE HEALTH OF ANIMALS
BRANCH.

Intestinal Parasites of Poultry, their Prevention and Treatment, by A. B. Wickware, V.S., Assistant Pathologist and Investigator of Poultry Diseases, co-operating with the Poultry Division of the Dominion Experimental Farms; Bulletin No. 25. Here is a sixteen-page bulletin first of all describing the pests to which fowl are internally subject, and then prescribing the remedies. It is the result of years of investigation into the nature of the disorders that it is estimated cause a loss of ten per cent of the yearly production of the poultry industry. Three full-page plates giving the pests as they appear at various stages, in most cases enlarged to aid in distinguishment, add greatly to the value and interest of the bulletin.

THE PROVINCIAL DEPARTMENTS
OF AGRICULTURE

ONTARIO.

War Breads, by Ethel M. Chapman. This is a sixteen-page bulletin, numbered 251, designed to show how the house-keeper can help to save the wheat supply of the country. Its text is that bread must be made of other grains than wheat, and furnishes a number of recipes by which this can be effected. It also announces a programme of demonstration-lecture courses to be given during the autumn and winter by instructors sent out by the provincial Department of

Agriculture and arranged by the Women's Institutes through the Superintendent, Mr. George A. Putnam.

Corn-Growers' Association Annual Report, 1916. Features given in this report are addresses by Prof. J. D. Harper of Indiana; Prof. G. E. Day, Ontario Agricultural College; Dr. C. A. Zavitz, Professor of Field Husbandry, O.A.C.; W. E. Saunders, London, Ont.; Wm. Scarf, President of the Ontario Fairs Association; J. L. Dougherty, District Representative, Kent; Robert W. Knister, president of the Association, and Principal Creelman; Ontario Agricultural College.

Vineland Horticultural Experiment Station. A report of this station recently issued covers the whole period of its existence up to the end of the year 1915. It was in 1906 that the late M. F. Rittenhouse of Chicago presented the land to the Ontario Government that was the beginning of the station. The report, which is plentifully illustrated, contains elaborate tables tracing the progress of the experiments that have been undertaken and plainly worded text describing results.

The Entomological Society of Ontario. The forty-seventh annual report of this society makes a blue book of 174 pages. It contains a verbatim report of the proceedings at the fifty-third annual meeting, held at the Ontario Agricultural College, Nov. 2nd and 3rd, 1916, and includes reports from other societies and the various divisions as well as papers by a number of recognized authorities.

The Bee-Keepers' Association of Ontario. The thirty-seventh annual report of this Association is comprised in 62 pages, and includes a deal of valuable information embodied in a series of interesting papers.

MANITOBA.

Poultry Houses for Farm and Town, by M. C. Herner, B.S.A., Professor of Poultry Husbandry, Manitoba Agricultural College; Extension Bulletin No. 15. Assisted by Mr. R. Mitchell, an agricultural engineering expert from the College, who has furnished a large variety of drawings of construction plans with dimensions, Mr.

Herner goes into his subject very fully. He advises as to location and requirements for breeding, rearing and keeping and as to sanitary arrangements.

"Eggs from the Farm to the Consumer" and "How to Preserve Eggs" are the titles of Circulars Nos. 46 and 47 by M. C. Herner, B.S.A., Manitoba Agricultural College. The first mentioned deals with the wastefulness of existing systems, and advises how it can be remedied. The second circular conveys counsel by the following of which both the producer and consumer would benefit.

SASKATCHEWAN.

Co-operative Organization. The third annual report of the Co-operative Organization Branch of the Provincial Department of Agricultural, covering the twelve months ending April 1st, 1917, gives details with statistical tables showing the marvellous progress that the co-operative movement has made in the province since its inception, and especially during the last three years. It tells the story of the operation of 309 associations.

ALBERTA.

Settlers' Guide. An artistically elaborate booklet of 32 pages has been issued by the Alberta Department of Agriculture under this title. With handsome, telling illustrations, the climate and great productivity of Alberta are described, with statistical proofs and land regulations,

pointers for settlers, quarantine regulations and passenger and freight rates.

MISCELLANEOUS.

The first volume of the Canadian Pony Stud Book has been published by the Canadian Pony Society and issued from the office of the Canadian National Live Stock Records, Ottawa, where it was compiled and edited. It is a handsome little volume comprising nearly 200 pages with several full page illustrations and containing lists of the officers from 1909 to 1916, statistics as to registration and transfers during the same years, the constitution and rules of entry revised up to date, lists of members, breeders and owners and Shetland stallion registrations from 1 to 203, Shetland mares from 1 to 692, Welsh stallions from 1 to 33, Welsh mares from 1 to 112, and 1 polo stallion.

The Protection of Birds. Instead of issuing a year book, the Canadian Society for the protection of birds has been content with circulating leaflets giving the reports of the secretary and treasurer and the objects of the society, and an eight-page circular, entitled, "How to Attract the Birds," written by Frank F. Payne, Secretary of the Dominion Meteorological Service. The circular is illustrated with drawings of nesting boxes, of which the necessary dimensions are also given. These publications will be forwarded on application to the Secretary, 149 University Ave., Toronto.

NOTES

Mr. C. W. McDougall, Superintendent of Dairying in the Department of Agriculture of New Brunswick, died on September 11th, as the result of an automobile accident.

Mr. Morley Pettit, Provincial Apiarist for the province of Ontario, has resigned his office to take up honey production at Georgetown.

The annual summer outing to the Experimental Station, Fredericton, of the New Brunswick Farmers and Dairymen's Association attracted an attendance of seven or eight hundred. The recently formed New Brunswick Potato Growers' Association joined forces for the occasion with the Dairymen. Addresses of welcome were delivered by Mr. W. W. Hubbard, Superintendent of the Station, and His Honour the Lieutenant-Governor of the Province; Professor Saxby Blair, Professor Cunningham, the Provincial Live Stock Husbandman and Mr. Leslie Elmsley of the Central Farm led in demonstrations and illustrations of the work that is in progress.

The Ontario Crop Bulletin for August gives the number of horses in the province on July 1st as 765,873, a decrease from 1916 of 9,859, of milch cows as 1,069,338, an increase of 24,309; of other cattle as 1,758,271, an increase of 68,583; of sheep and lambs as 956,986, an increase of 48,920; of swine as 1,664,639 a decrease of 70,615; of turkeys as 439,215, a decrease of 118,714; of ducks as 480,263, a decrease of 106,442, and of other fowl as 12,297,155, a decrease of 528,009. The number of live stock sold or slaughtered up to June 30 is recorded as: horses, 83,194, an increase compared with 1916 of 5,077; of cattle 903,184, an increase of 24,644; of sheep 468,576, a decrease of 11,830; of swine 2,137,999, an increase of 32,378, and of poultry 6,706,531, a decrease of 68,353.

INDEX TO PERIODICAL LITERATURE

- Saturday Press and Prairie Farm*, Saskatoon, Sask., September 1st, 1917.
Home Canning, Mrs. Rutter, University of Saskatchewan, page 10.
Warfare on Bag Eggs, M. A. Jull, page 14.
- Sept. 8—Wheat Prospects After the War, T. K. Doherty, International Institute of Agriculture, page 7.
- Sept. 15—Sheep in Saskatchewan, W. H. Tisdale, B.S.A., Assistant Professor of Animal Husbandry, University of Saskatchewan, page 11.
- Grain Growers' Guide*, Winnipeg, Man., August 29th, 1917.
Drying the Surplus: An Old Method of Food Preservation being Revived in the Time of Need, page 1371.
- Sept. 19—Providing Proper Potato Storage, page 1479.
- Farm and Ranch Review*, Calgary, August 20th, 1917.
Co-Operative Dairying in Saskatchewan, F. M. Logan, Asst. Dairy Commissioner for Saskatchewan, page 741.
- Sept. 5—Forage Crops for Western Canada, being addresses by Prof. J. Bracken, Field Husbandry Department, University of Saskatchewan; W. H. Fairfield, Supt. Dominion Experimental Farm, Lethbridge; Don H. Bark, Chief of Irrigation Investigation Division of the C. P. R., and Professor L. S. Klinck, Dean of the Faculty of Agriculture, University of British Columbia, page 775.
- Canadian Horticulturist and Beekeeper*, Toronto, September 9th, 1917.
Apple Packing in Nova Scotia, G. H. Vroom, Chief Fruit Inspector for Maritime Provinces, page 241.
- Farmer's Advocate and Home Journal*, Winnipeg, August 8th, 1917.
Securing Pure Water and Purifying Rain Water, Dr. M. Seymour, Commissioner of Public Health for Saskatchewan, page 1123.
Handling Manure, W. J. Rutherford, B.S.A., Dean of College of Agriculture, Saskatoon, page 1127.
- Aug. 15—Sweet Clover as a Pasture Crop, by H. S. Coe, Bureau of Plant Industry, Dept. of Agriculture, Washington, U.S.A., page 1155.
- Aug. 22—Sterility in Oats Caused by Thrips, Dr. C. Gordon Hewitt, Dominion Entomologist, page 1183.
- Aug. 29—Systems that Favor Weed Eradication, Professor Thomas Shaw, page 1210.
- Sept. 12—Country Schools and Agriculture, page 1261.
- Sept. 19—To the College—Back to the Farm, page 1291.
- Sept. 19—Opportunity in Manitoba Sheep Raising, W. W. Fraser, Live Stock Commissioner for Manitoba, page 1292.
- The Agricultural Journal*, Victoria, B.C., July, 1917.
Causes of Variation in Cream Tests, T. A. F. Wiancko, Provincial Dairy Instructor, page 86.
Arsenate of Lime for Spraying—Two Years of Experimental Work have Shown its Advantage Over Arsenate of Lead, Dr. C. Gordon Hewitt, Dominion Entomologist, Ottawa, page 90.
Breeding Stock Must be Selected Carefully, T. Reg. Arkell, Chief, Sheep and Goat Division, Department of Agriculture, Ottawa, page 92.
- Aug.—Mother Nature as Insect Pest Controller, John D. Tothill, In Charge of Natural Control Investigations, Entomological Branch, Ottawa, page 107.
- The Importance of Cow-Testing, G. H. Barr, Chief of Dairy Division, Ottawa, to Dairymen of British Columbia, page 109.
- The University and Agricultural Instruction College of Agriculture is Conducting Research, Teaching and Extension Work, L. S. Klinck, Dean College of Agriculture, University of British Columbia, page 105.
- Canadian Poultry Review*, Toronto, September, 1917.
Breeding and Selection of Commercial Poultry, H. E. Upton, Live Stock Branch, Dept. of Agriculture, B.C., page 358.
- Canadian Farm*, Toronto, August 31st, 1917.
Poultry—A Universal Profit-Maker Manager and Lecturer, Poultry Department, Macdonald College, page 19.
- Journal of Agriculture and Horticulture*, Quebec, Que., September 1st, 1917.
Poultry—The Farmers Should Produce More Eggs, M. A. Jull, Macdonald College, page 45.
- O. A. C. Review*, Guelph, Ont., August, 1917.
Can a School Teacher Keep Bees, Morley Pettit, Provincial Apiarist, page 481.
Bees in Combless Packages, W. F. Geddes, page 484.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section of THE GAZETTE should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, Ottawa.

Unless application through the Canadian Commissioner is preferred, the original Institute Bulletins may be obtained direct from the General Secretary of the International Institute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

	Per annum
International Review of Agricultural Economics.....	18 francs
International Review of the Science and Practice of Agriculture.....	18 "
International Crop Report and Agricultural Statistics.....	6 "
The Three Bulletins together.....	36 "

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

The Organization of the Agricultural Department of the Belgian Congo.—FALLON, BARON F., in *International Review of the Science and Practice of Agriculture*, February, 1917, pp. 177-185.

In an article in the original Institute Bulletin the author deals with the subject under the following heads: Research Laboratories; Experimental Stations; Development of European Colonization; Development of Native Agriculture. A list of the publications of the Department is also given.

The Organization for the Prevention of Fraud in France.—TOUBEAU MAXIME, in *International Review of the Science and Practice of Agriculture*, March, 1917, pp. 319-326.

214—Appropriations of the Federal Department of Agriculture of the United States for the Fiscal Year Ending June 30, 1917, in *Experiment Station Record*, Vol. 35, No. 4, pp. 301-310, Washington, September, 1916. (4 pp. in Institute Bulletin).

215—The Distribution of Crops and Farm Animals in the United States.—FLOWER, P. W., in *The Field*, Vol. XXVI, No. 12, p. 1031, New York, December, 1916. (3 pp. in Institute Bulletin).

A table in the original Bulletin gives the acreage devoted to the chief crops in the different states of the Union and the distribution of cattle, horses, mules, swine and sheep. It was compiled by the writer, at the request of the Taylor-Critchfield-Clayne Company from the official statistics of the United States Department of Agriculture. The table shows how the various states compare as to crops and live-stock.

118—Recent Researches of the Imperial Institute on: Fibres from the Belgian Congo: the Pineapple as Fruit and Fibre Producer; Ceara Rubber from Manihot Glaziovii in Nigeria; the Essential Oil from the Tubers of Kaempferia Ethelae; The Essential Oil of Cymbopogon flexuosus.—*Bulletin of the Imperial Institute*, Vol. XIV, No. 3, pp. 378-388; 437-460. London, July-September, 1916. (4 pp. in Institute Bulletin).

CROPS AND CULTIVATION

220—Effect of Meteorological Factors on the Germination Capacity of Seeds.—WALIDEN, J. N., in *Sveriges Utsaede-forenings Tidskrift*, Year XXVI, No. 4, pp. 146-162, 4 fig. Malmö, 1916. (3 pp. in Institute Bulletin).

119—Experiments on Loss of Moisture from Soils by Evaporation (Dry Farming).—DE ANGELIS D'OSSAT G., in *Le Stazioni Sperimentali Agrarie Italiane*, Vol. XLIX, No. II, pp. 563-582, 4 tables, 7 fig. Modena, 1916 (Abstract by Author). (2 pp. in Institute Bulletin).

222—Water Penetration in the "Gumbo" Soils of the Bellefourche Reclamation Project, South Dakota, United States.—MATHEWS, O. R., in *U. S. Department of Agriculture, Bulletin*, No. 447, 12 pp. 4 fig. Washington, D.C., November 2, 1916. (2 pp. in Institute Bulletin).

223—Draining and Cultivation of the Poitevin Marsh, France.—WELSH JULES, in *Annales de Géographie*, Year XXV, No. 137, pp. 325-346. 3 fig. Paris, 1916.

120—Stimulating Influence of Arsenic upon the Nitrogen-Fixing Organisms of the Soil.—GREAVES, J. E., (Bacteriologist, Utah Agricultural Experiment Station) in *Journal of Agricultural Research*, Vol. VI., No. II, pp. 389-426 + fig. 1-5. Washington, D.C., June 12, 1916.

In the course of previous experiments, the writer found that the addition of arsenic to the soil stimulates the ammonifying, and especially the nitrifying micro-organisms. The stimulation varied greatly with the form, quantity, and method of applying the arsenic. Further, it was found that very large quantities of arsenic had to be applied to a soil before its toxic effect became marked. This toxic effect became pronounced only when quantities of arsenic which far exceeded those found in any of the cultivated soils had been applied. Therefore it was desirable to determine the influence and mode of action of arsenic upon the nitrogen-fixing powers of the soil. For this purpose the writer made cultures in a sandy loam to which mannite was added as well as the various arsenical compounds, in solution and in the dry state, which were used in the experiment. After incubation, the total nitrogen was determined. The arsenical compounds used were: sodium arsenate, lead arsenate, cupric aceto-arsenite (Paris Green), arsenic trisulphide and zinc arsenite in the serial proportions of 0 to 400 p. p. m.

The data thus obtained, and the results given by similar experiments carried out by other writers, prove conclusively that

arsenic, when added to the soil in the forms of sodium arsenate, lead arsenate, or of arsenic trisulphide and zinc arsenite, stimulates the nitrogen-fixing powers of the soil. This stimulation is greatest when lead arsenate is applied and least when zinc arsenite is used. Paris green did not stimulate in any of the concentrations and became very toxic when the concentration reached 120 p. p. m. The toxicity of this compound is due to the copper, and not to the arsenic contained in it. Sodium arsenate became toxic when a concentration of 40 p. p. m. of arsenic was added, and 250 p. p. m. of arsenic entirely stopped nitrogen fixation. On the other hand, lead arsenate was not toxic, even at a concentration of 400 p. p. m. of arsenic, while the toxicity of arsenic trisulphide and of zinc arsenite was very small at this concentration.

The stimulating effect of arsenic is not due to any inherent peculiarity of the soil used, for soils which vary greatly in physical and chemical properties had their nitrogen-fixing powers greatly increased when arsenic was applied to them. Soils high in organic matter fixed as much nitrogen, in the presence of arsenic and in the absence of mannite, as they did in the absence of arsenic and the presence of mannite. The stimulation is greatest when the water-soluble arsenic content is about 10 p. p. m. and as this quantity exceeds that found in most soils, it is probable that in agricultural practice, arsenic will stimulate and not retard bacterial activity in the soil.

Only one type of *Azotobacter* was isolated which was stimulated by arsenic, and in this case the stimulation was due to the organism utilising its source of carbon more economically in the presence of arsenic than in the absence of arsenic. Thus arsenic and its compounds do not act as sources of energy to the organisms. The main part of the stimulation noted in the soil with its mixed flora is undoubtedly due to the arsenic inhibiting injurious species.

A given quantity of arsenic which acts as a stimulant to bacteria when placed in soil may become very toxic when tested by the Remy—solution method (1).

Arsenic cannot replace phosphorus in the vital process of the nitrogen-fixing organisms, but it can in some manner liberate the phosphorus from its insoluble compounds. This may be either a direct, or an indirect, action.

(1) An inoculated and incubated nutritive solution containing, bi-potassic phosphate 0.2 per 1000—magnesium sulphate 0.2 per 1000—calcium chloride 0.2 per 1000—calcium carbonate 10 per 1000—feric chloride 1 drop of solution containing 10 per cent per litre.

The cellulose ferments are stimulated by arsenic, and in their turn, react upon the activity of the nitrogen-fixing organisms.

The nitrogen-fixing powers of soil extract, of filtered soil extract and soil dried for some time are only slightly stimulated by arsenic, which shows that arsenic acts mainly by the removal of a thermolabile body occurring in the soil.

In the appendix is a bibliography of the 45 publications mentioned in the text of the article.

122—New Phosphatic Limestone Deposits in Mexico.—FLORES TEODORO, in *Memorias y Revista de la Sociedad Científica Antonio Alzate*, Vol. 34, No. 10, pp. 351-362, 5 plates. Mexico, October, 1916.

123—Experimental Kelp Plant at Summerland, California.—*Engineering and Mining Journal*, Vol. CII, No. 25, p. 1070. New York, December 16, 1916.

The Bureau of Soils of the Department of Agriculture is preparing to erect at Summerland, Calif., an experimental plant for the production of potash from Pacific Coast kelp. The details of the plant are not completely developed yet, but Mr. D. F. HOUSTON, Secretary of Agriculture, states that the plans contemplate the drying of the kelp as it comes from the water in a series of rotary driers, after which the dried material will be distilled in retorts analogous to a by-product coke oven.

Ammonia, combustible gas, tar and some other materials will be recovered, and the resulting charcoal will contain the potash salts. These will be leached out and recovered by evaporation after which the charcoal will be available either as a marketable commodity or as fuel. By recovering the various byproducts and saving the heat units involved in the combustion of the kelp, the Bureau of Soils hope to develop a process that will permit the continued production of potash from this American source.

229—Effect of Sodium Salts in Water Cultures on the Absorption of Plant Food by Wheat Seedlings.—BREAZEALE J. F., in *Journal of Agricultural Research*, Vol. VII, No. 9, pp. 407-416. Washington, D.C. November 27, 1916.

130—Role of Ammonia in the Metabolism of Nitrogenous Substances in Plants.—I. PRIANICHNIKOV, D. N., *Ammonia as alpha and omega of the metabolism of nitrogenous substances in the plant*, in *Agronomical Institute of Moscow. Collection of papers from the Agronomical Laboratory under the direction of Prof. D. N. PRIANICHNIKOV*, Vol. X, pp. 1-24, Moscow, 1916.—II. NICOLAIEVA, A. G., *Accumulation of asparagine in young shoots of Lupinus*

luteus in conditions of nutrition with various ammoniacal salts. *Ibid.* pp. 380-383.—III. MOROSOV, V. A., *Influence of alkalinity of solutions on the metabolism of nitrogenous substances in young pea shoots*. *Ibid.*, pp. 384-390.—IV. PRIANICHNIKOV, D. N., and KACHEVAROVA, O. N., *Influence of carbohydrates on the behavior of the lupin in connection with ammoniacal salts, influence of ether and other solvents of fats on the germination capacity of the seeds*.—V. KABLOUKOV A. S., *Influence of the removal of the endosperm on the behaviour of young maize shoots in connection with ammoniacal salts*, *Ibid.*, pp. 155-158. (7 pp. in Institute Bulletin).

131—Relation Between Alkalinity of the Culture Medium and Plant Yield. Experiments made in Russia.—I. GEMTCHOUGENIKOV, E. A., *The Relation Between Alkalinity and the Yield of Plants Repeatedly Sown in Sand*, in *Moscow Agricultural Institute, Report of the work of the Agricultural Laboratory under the direction of Professor D. N. Prianchnikov*, Year 19, Vol. X, pp. 337-351 + 1 diagram, Moscow, 1916.—(Jakouchkine, I. V.) Supplement to E. A. GEMTCHOUGENIKOV's article, *Ibid.*, pp. 352-354. (3 pp. in Institute Bulletin).

In his experiments in 1914, M. GEMTCHOUGENIKOV tried to obtain the conditions necessary to explain the effect of the accumulation of bases in sand cultures without having recourse to any direct estimation of the alkalinity of the nutritive substratum.

These conditions were obtained in two ways: A) by modifying the nutritive solutions; B) by choosing suitable plants.

M. JAKOUCHKINE points out that the principal conclusion to be drawn from M. GEMTCHOUGENIKOV's experiments is that all modifications which hinder the accumulation of bases in the solution in which the plant is growing, are of assistance to it.

132—Effect on Plant Growth of Sodium Salts in the Soil.—HEADLEY F. B., CURTIS E. W., and SCOFIELD, C. S., in *Journal of Agricultural Research*, Vol. VI, No. 22, pp. 857-869, fig. 1-8. Washington, D.C., August 28, 1916.

134—Daily Transpiration During the Normal Growth Period and Its Correlation with the Weather.—BRIGGS L. J. (Biophysicist in Charge, Biophysical Investigations, Bureau of Industry, U.S. Dept. of Agriculture) and SHANTZ, H. L. (Plant Physiologist, Alkali and Drought Resistant Plant Investigations, Bureau of Plant Industry, U.S. Dept. of Agriculture). *Journal of Agricultural Research*, Vol. VII, No. 4, pp. 156-212, figs.

- 1-18, pls. 5-6. Washington, D.C., 1916. (2 pp. in Institute Bulletin).
- 135—"Fylgia," "Extra Squarehead III," "Sol II," "Pansar," "Thule II," Varieties of Wheat selected at Svalof, Sweden.—NILSSON-EHLE, H.; in *Sveriges Utsadesforenings Tidskrift*, Year XXVI, Part 3, pp. 97-101; 106-108; 109-112 + 1 Plate; 113-114; 115-118. Malmoe, 1916. (6 pp. in Institute Bulletin).
- 231—Studies on Oat Breeding in Maine, United States. Selection within Pure Lines.—SURFACE M., FRANK, and PEARL RAYMOND, in *Maine Agricultural Experiment Station, Bulletin* 235, pp. 1-40. Orono, Maine, 1915. (3 pp. in Institute Bulletin).
- 233—Some Recent Investigations in Sugar-Beet Breeding in the United States.—PRITCHARD, J. FREDERICK, in *The Botanical Gazette*, Vol. LXII, No. 6, pp. 423-465, XXXII Tables, 51 fig., Chicago, Illinois, December, 1916. (5 pp. in Institute Bulletin).
- 240—Growing of Early Season Potatoes from Sprouts.—CADORET, ARTHUR, in *Le Progres agricole et viticole*, 34th Year, No. 3, pp. 66-67. Montpellier, January 21, 1917.
- 137—Selection Experiments on some Varieties of Raspberries in the United States.—ANTHONY, R. D., and HEDRICK, U. P., in *New York Agricultural Experiment Station, Geneva, Bulletin* No. 417, pp. 75-88, Plates I-VIII. Geneva, N.Y., March, 1916.
- The purple raspberry described for the first time by PECK in 1869 under the name of *Rubus neglectus* is a hybrid of the black-cap and red raspberry. The variability and inconstancy of the colour and appearance of the plant show its origin and nature, as do also the numerous experiments and cultural tests which have been carried out to prove its hybrid character. The popularity of this raspberry has been increasing rapidly and in some regions it has largely supplanted the black-caps, owing to its heavy production and its nearly complete immunity from anthracnose. At present, only two varieties of the purple raspberry are known, "Columbian" and "Shaffer" and these are but chance hybrid seedlings.
- The success which they have had in so short a time shows the good results and the perfection that can be attained by means of judicious selection.
- At the Geneva Agricultural Experiment station, some pure seedlings have been obtained; these give promise of new varieties much superior to any now under cultivation. The best mode of procedure, however, would seem to be to cross the most desirable reds and blacks, rather than to attempt inter-crossing among the purples or to grow pure seedlings of any purple sorts. Among the red varieties the following were studied: Marlboro, June, Cuthbert, Herbert; and among the black; Cumberland, Hilborn, Palmer and Smith No. 1. Details are given in regard to each. With regard to Herbert it is stated: This variety lacks vigour and many of the plants died before bearing fruit. A few which survived, however, fruited and produced large berries of excellent quality. Hence it would seem that Herbert should be combined with some vigorous variety. Good results were secured by crossing it with June, (a variety descended from Marlboro, which has been described above).
- 142—Fertiliser Trials with "Tetraphosphate" in Piedmont Rice Fields, Italy.—MARCARELLI and NOVELLI, in *Il Giornale di Riscicoltura*, Vith Year, No. 21, pp. 321-327. Vercelli, November 15, 1916.
- 144—Variety Tests of Maize.—HUTCHINSON C. B., EVANS A. R., HACKLEMAN T. C., and McDONALD E. M., in *University of Missouri Agricultural Experiment Station Bulletin* 143, pp. 56. Columbia, Missouri, July, 1916. (2 pp. in Institute Bulletin).
- 145—Choice of Varieties and Seed Selection in Forage Crops.—VIGGIANI D., in *Atti della Reale Accademia-dei Georgofili di Firenze*, 163rd Year, No. 3, pp. 128-137. Florence, July, 1916.
- 146—History, Cultivation and Improvement of *Lolium perenne* at Svalof, Sweden.—WITTE HERNFRID, in *Sveriges Utsadesforenings Tidskrift*, Year XXVI, No. 5, pp. 195-205, 2 fig. Malmoe, 1916. (2 pp. in Institute Bulletin).
- 234—Production of Seed of Sugar Beet in Russia.—I. Production of Sugar Beet Seed in Russia by selection of seeds produced in the country, in *Appendices to the Report presented to the Ministry of Agriculture by the Direction of the Society of Southern Russia for the encouragement of agriculture and agricultural industries, on the question of providing Russia with sugar beet seed from local picked sources*, pp. 1-164. Kiev, 1916.—II. KRIUKOV, N. A., Sugar Beet Seed in Russia, in *The Agricultural Gazette*, No. 38 (154), pp. 1018-1020. Petrograd, 1916.—III Present state of plant-breeding in the Government of Podolia, in *The Podolian Agriculturist*, No. 78, pp. 17-22. Vinniza, 1916. (3 pp. in Institute Bulletin).
- A table is given showing the production of sugar beet seed in the different countries during the last few years. The table shows that the production of commercial

sugar beet seed is essentially concentrated in two countries: Russia and Germany, and their united production represents nine tenths of that of the whole world.

At the present time the Department of Agriculture, the sugar refineries and in some cases the zemstvos and leading firms as well, are taking measures to increase the production of picked Russian seed in order to satisfy home need and those of exportation also.

At the close of the 3rd period, the purely Russian production of sugar beet seeds rose from 16,300,000 lb. to 20,000,000 lb., whereas at the beginning of the same period it did not surpass 11,000,000 lb. This production represents about 30 per cent of the total Russian consumption. Native and foreign seeds of beets of generally lower sugar content are responsible for 20 to 25 per cent and foreign seeds of good quality (though not superior to the best Russian) represent 50 per cent.

II.—KRIOUKOV insists on the necessity for organising on a large scale, with the aid of the Department of Agriculture, the production of prime quality Russian seed. He also advises the starting of trials with sugar beet in Turkestan in order to study the effect of the climate of this region upon the plant, especially with regard to the sugar content.

III.—The results of an enquiry held by the provincial zemstvo of Podolia into the state of plant breeding in this province. Among other matters reference is made to the chief firms interested in the selection of sugar beets.

151—Correlations Between Morphological Characters and the Saccharine Content of Sugar Beets.—PRITCHARD, FREDERICK J., in *American Journal of Botany*, Vol. III No. 7, pp. 361-376 + 8 fig. Lancaster, Pa., July, 1916. (4 pp. in Institute Bulletin).

153—Experiments on the Drying of Tobacco in Java.—DE VRIES, O., in

Mededeelingen van het Profestation voor Vorstenlandsche Tabak, No. XXV, Semarang, 1916.

154—Results of the Inter-Ministerial Conference in 1915 on the Production and Improvement of Medicinal Plants in Russia.—SAZYPEROV, F., in *Bulletin of Applied Botany*, Year IX, No. 7 (92), pp. 385-387. Petrograd, July, 1916. (3 pp. in Institute Bulletin).

This Conference (1), summoned by the Department of Agriculture in order to discuss the question of rendering the Russian Chemical Industry independent of foreign imports, was supported not only by the representatives of the various Government Departments but also by the representatives of science and of the most important commercial houses dealing with medicinal plants and their seeds. A summary of the recommendations and decisions adopted is given.

251—New Experiments in Pruning Apple Trees in Oregon, United States.—GARDNER, V. R., MAGNESS, J. R. and YEAGER, A. F., in *Oregon Agricultural College Experimental Station, Division of Horticulture Bulletin* 139, pp. 1-88 + XXII Plates. Corvallis, Oregon, August, 1916. (3 pp. in Institute Bulletin).

253—The Chemical Composition of American Grapes Grown in the Central and Eastern States.—ALWOOD WILLIAM B., in *United States Department of Agriculture Bulletin* No. 492, 20 pp. Washington, D.C., December 18, 1916. (4 pp. in Institute Bulletin).

158—The Restoration of Forests Devastated by the Operations of War.—JOLYET, A. (Professor at the Ecole Nationale des Eaux et Forêts), in *La Nature*, No. 2256, pp. 401-406, figs. 1-7. Paris, December 23, 1916.

(1) See also *Bulletin of Foreign Agricultural Intelligence*, November, 1916, No. 651.

LIVE STOCK AND BREEDING

160—The Treatment of Enteritis paratuberculosis bovis specifica by Methylene Blue.—STUTE, in *Berlin Tierärztliche Wochenschrift*, Year 32, No. 50, p. 594. Berlin, December 14, 1916.

In September 1916, the author found that the disease called *Enteritis paratuberculosis bovis specifica* had caused serious damage in a herd of 40 cows in West Prussia. Besides the disinfection of the shippings and isolation of infected animals, 2 grains of HOECHST methylene blue were ordered to be given per head on each of 5

consecutive days. Eight days after the first treatment, another was given, using the same amount. The animals under treatment gradually recovered and increased in weight. Judging from this result, the writer advises the study of the therapeutic value of methylene blue for this form of enteritis, as it is said by MARTENS-SANGERNHAUSEN to be effective against swine fever.

162—The Effects of Feeding the Proteins of the Wheat Kernel at Different Planes of Intake.—MCCOLLUM, E. V., SIMMONDS,

N., and PITZ, W., in *The Journal of Biological Chemistry*, Vol. XXVIII, No. 1, pp. 221-229, 17 Diagrams. Baltimore, Md., December, 1916.

163—**Dietary Deficiencies of the Maize Kernel.**—MCCOLLUM, E. V., SIMMONDS, N., and PITZ, W., in *The Journal of Biological Chemistry*, Vol. XXVIII, No. 1, pp. 153-165, 10 Diagrams. Baltimore, Md., December, 1916.

257—**The Valuation of Feeding Stuffs.**—PFEIFFER, E., in *Fühlings Landwirtschaftliche Zeitung*, Year 65, Part. 21-22, pp. 484-507. Stuttgart, November 1-15, 1916. (3 pp. in Institute Bulletin).

265—**Economics of the Breeding of Pure-Bred Stock.**—WENTWORTH, E. N., *The Field*, Vol. XXVI, No. 12, pp. 1009-1011. New York, December, 1916.

Pure-bred stock represents the accumulated effort of generations of breeders leading to a well defined end, which may be

expressed in profits already realised or in profits to be realized in the future. The price of pure-bred stock exceeds that of normal stock in view of the productive or reproductive capacity peculiar to each individual in relation to that of normal common individuals. This excess of value depends in its turn on various factors each of which represents the relative commercial value of a character exceeding those of the ordinary type on the market.

Careful observation of the markets shows that this increase is, roughly speaking, 15 to 20 per cent for reproductive power and more than 50 per cent for purity of blood combined with reproductive power.

The facts contained in the appended table, which refer to the maize-zone of the United States, whilst representing approximate averages, show this phenomenon much more clearly than could the valuation of profits on pure-bred stock which have either been already realized or remain to be realized in the future.

	Pigs (about 133 kg.)	Beef Animals	Sheep	Agricultural Mares	Dairy Cows
Normal average market value	\$27	\$ 90	\$ 7 50	\$225	\$150
Reproductive value	32	110	9 00	260	150
Value of purity of blood	45	150	12 50	400	250

These relative prices naturally refer to animals of similar type and conformation. Reproductive power in dairy cows does not increase the normal average market value because this is based on milk production which is an inverse quality to reproductive power.

Reproductive power increases the value of an animal because it gives a higher profit on the market than does normal production.

The value of pure-bred animals, on the contrary, is based more on future than present profits. Given two reproducers of equal individual merit, the pure-bred reproducer has a much higher value because, as a rule, it represents a better guarantee for good progeny. Reproductive capacity includes two factors: 1) the power of transmitting good characteristics to the descendants with greater uniformity; 2) a less strong tendency to the appearance of negative characteristics in the descendants. Both these advantages are the result of selection based on the ascendants to eliminate negative qualities and to unify and improve positive qualities.

There are many possible methods of obtaining these results, but none of them have a positive value because the relative success gained depends on the way in which the breeder makes use of them. They have the practical character of a

weekly test of the control of milk production. Anyone attempting to deduct from this the exact production of the productive cycle of the cow would find many contradictions in its application.

If it is used for comparison between two or more individuals, better results may be obtained. Finally, when used to study the special qualities of an individual which cannot develop under normal conditions, the weekly test at high tension, so to speak, is a method which allows a fundamental study to be made of the latent or reserve energies of the individual in relation to its productive power, its capacity of transforming food-stuffs and its nervous organization.

In the same way the application of indications of predominant character, of pedigree, of fancy points or of family lines, as measures of the capacity to transmit characteristics should only be taken into consideration in so far as these various elements are correctly interpreted. If they are used as relative and not as absolute measures, they express in part the degree of uniformity and of constancy to which the pure-bred animal is capable of transmitting its characteristics, but they are practical methods capable of giving results only when used by experienced breeders who can estimate the value of failure as well as that of success.

Thus the predominant character in hereditary transmission does not go beyond the specific characteristics peculiar to the masculine or feminine appearance.

The fancy points only constitute the trade mark of the race, and hereditary power is usually quite independent of characteristics of value. It cannot, therefore, be said that, because it transmits certain more or less insignificant traits characteristic of the race, it has any special degree of dominance.

Biologically, the progeny represent data of greater value although, from a practical point of view, there are also considerable differences in this respect.

To the intelligent breeder the pedigree is the most important consideration to be kept in mind. If there are animals whose excellence has been proved most closely related to the genealogical tree, and if they occur in both branches of the genealogy at the same time, the breeder may feel a certain sense of security with regard to the power of transmitting superior characteristics. The greater the number of descendants whose worth has been proved, the greater is the certainty with regard to dominance. With regard to valuable animals, the length of the pedigree is looked upon by breeders as an indication of marked powers of reproduction and selection. The length of the pedigree is an equally valuable criterion in the descendant and it is here that a pure-bred animal is superior to at grade animal. Each breeder could have actual data with regard to the power of transmitting characters possessed by any given dam, but other breeders could have no knowledge of these qualities and, a few years later, all traces of its individual merits will have disappeared. The individual merits of a pedigree animal are actual data which pass into the annals of the race to which it belongs, data which are taken into account in the valuation of each lineal descendant, which represents a hereditary fraction of these merits. Admitting that the merits of the immediate ascendants of an animal of common stock improved by a pure-grade are known, and that a pure-grade animal has immediate ascendants of equal value, this latter will have over the improved animal the advantage of progenitors having a well-defined identity which will allow the collected efforts of many breeders to be utilized. The relative value of the pedigree and of individual merit is a problem which deserves special attention. In this respect it must be remembered that a pure-bred animal may become a scrub under the influences of two forces, each with a separate action; it may appear to be a failure because the good qualities have disappeared or have been lost in the hereditary transmission, or, more often, it may appear to be a failure because of insufficient develop-

ment. If it is certain that this inferior animal belongs to the second class it should always be used for reproduction in preference to an animal chosen by crossing, even if this latter has certain superior individual qualities. If it belongs to the first class there is no likelihood that, for the breeder, it has a superior value to the other. In consideration of the difficulty of determining the reason for the inferiority of a pure-bred animal, it is, in practice, usually wise to refrain from excessive optimism.

Breeders of pure-breds are also often faced with the problem of selecting from individuals of high lineal descent but of secondary merit, and from those of less celebrated family or descent, but with marked individual merit. In such cases the choice must be subordinated to the aims of the breeder. If he wishes to sell his products to breeders or producers of improved animals he should choose animals of individual merit. If he wishes to develop his dairy herd for exhibition or competition purposes he should still give preference to individual merit. If, on the other hand, he wishes to become a professional breeder of pure-bred stock, according to more distant, or even more difficult schemes, he cannot ignore celebrated pure-breds, especially if he intends to sell his products to breeders working for the same end. In this case, whilst considering individual merits, even the best individuals will be sold at a lower price than animals belonging to celebrated families of pure-breds.

The profits from the breeding of pure-bred stock are closely connected with the fact that it is a sort of nursery in which the original seed reproduces itself with an identical aim. It can, therefore, not be compared with ordinary breeding.

The breeding of pure-bred stock in the United States only includes from 2 to 4% of the total of the various zootechnical categories; by reason of its nature it must progress slowly. This is due to the fact that this branch of animal production is relatively new, and that in the past, it was limited to breeders and agriculturists to whom the cost of pure-bred reproducers was a matter of secondary importance.

Since pure-bred stock are considered, so to speak, only as breeding animals, they command a price on the market which is unknown to ordinary or improved stock. It is in these prices that lie the market profits, which, when finally analysed, represent the capacity for transmitting economical characteristics to the progeny. This capacity cannot be recognized, however thoroughly it may be studied, even after 2 or 3 years of reproductive tests. The breeder of pure-breds who studies the indications which he believes to be connected with hereditary power and who acts on these indications is assured of profits which

cannot be realized in ordinary animal-production for general market purposes.

- 167—**Comparative Table of Milk Production in Dairy Herds in Relation to Age and Duration of Lactation, in the United States.**—PEARL RAYMOND, in *Maine Agricultural Experiment Station, Report of Progress on Animal Husbandry Investigations in 1915*, No. 519-12-15, pp. 3-8. Orona, Maine, 1916. (3 pp. in Institute Bulletin.)

Statistical data provided by milk records of various societies, suitably equalized, have been used by the Maine Agricultural Station, under the direction of the writer, in order to compare milk production in dairy herds with the age and duration of lactation. The Table thus prepared gives a comparison between 2 dairy herds under different conditions as regards age and period of lactation of the individual animals in the herds.

- 170—**Sheep Feeding Experiments in Kansas.**—*Kansas Agricultural Experimental Station Directors' Report 1914-1915*, pp. 25-27; Manhattan, Kansas, 1916. (2 pp. Institute Bulletin.)

- 171—**Pumpkins as Food for Sheep.**—FAULKNER, A. F., in *The Journal of Agriculture*, Vol. XIII, No. 4, pp. 266-, 268, 1 Fig. Wellington, October, 20 1916.

The writer indicates the satisfactory results he has obtained in growing pumpkins for sheep-feed in Wairakaia, Gisborne,

New Zealand. They were grown according to the following method: the land is ploughed before the middle of August, worked fine in September, then tined harrowed once a fortnight to destroy any weeds. Sowing is done in October on the flat in rows in 16 to 18 ft. apart and in clumps of three seeds a yard apart in the row. With a single-furrow plough a man can line out rows of 16 to 18 ft. apart at the rate of about 16 acres a day, and 4 men or boys can sow 16 acres a day using 4 to 6 lbs of seed per acre. The plough-furrow should not be more than 2 in. deep. Transplanting for gaps is not necessary; it is better to fill in with fresh seed. The crop is inter-cultivated with single, double, or 3-horse cultivators, the row between and round the plants being worked by hand. If manure is needed, a handful of guano to each clump of 3 seeds gives good results. If the best seed is saved by the grower, such as those showing the best keeping and feeding properties the crop can be much improved.

A paddock of 17 acres contained the pumpkin crop, besides a 13-ton stack of lucerne hay, to which the sheep had free access. 1500 ewe hoggets were put in on the 14th June and were run 5 days on pumpkins and one day on grass till the 15th August—a total of 50 and 12 days respectively. When the sheep are first put in they eat all half-ripe and soft-skinned ones. After about a week it is necessary to commence splitting the harder pumpkins. Splitting for 1500 sheep takes about an hour a day. Hay is absolutely necessary for sheep on pumpkins.

FARM ENGINEERING

- 175—**Importation of Agricultural Machines and Implements into Russia from 1903 to 1912.**—*Summary of Statistical and economic data relating to the agricultural industry in Russia and abroad*, Vol. VIII, pp. 380-383. Petrograd, 1915.

The above publication of the Russian Department of Agriculture gives the data relating to the importation of agricultural machinery of different kinds summarized in tables.

- 176—**A Double Plough for Disabled Soldiers.**—*Deutsche Landwirtschaftliche Presse*, Year 43, No. 102, pp. 832, 1 fig. Berlin, December 20, 1916.

The seat can be moved horizontally and vertically so that the disabled man can adapt the seat to suit him and guide the plough like a bicycle and regulate the working depth. To the right or left of

the plough an adjustable support can be placed to support the injured limb of the worker.

As the weight of the man rests entirely on the small furrow wheel the draught of the plough is little increased.

The seat is provided by this firm for all the double ploughs constructed by them.

- 270—**Trailer for Men who have lost a Leg.**—MAURIN, G., in *Journal d'Agriculture pratique*, Year 80, No. 26, pp. 455-456 + 1 Fig. Paris, December 28, 1916.

Dr. Albert Martin of Rouen (France) invented this trailer, only weighing from 88 to 100 lbs., in order to enable men having lost a leg to work with a double plough without tiring themselves too much.

The apparatus, which consists of a wheel chair for the disabled man, is attached

behind the plough and at the end of each furrow the man gets out of the chair, detaches it from the plough, then turns and places the double plough in position; then he again attaches the drag on which he sits until the other end of the furrow is reached.

The drag is made of wood and is built symmetrically so as to permit its use in either direction. In the middle, under the seat, the drag is supported by a large furrow wheel and by a small land wheel, which latter can be adjusted in respect to the large wheel and according to the furrow-depth. For this purpose the axle of the small wheel carries an upright pierced with holes; a bolt holds the wheel in the desired position.

271—**Improved Apparatus for Determining the Test Weight of Grain, with a Standard Method of Making the Test.**—BOERNER, E. G., in *U. S. Department of Agriculture, Bulletin No. 472*, 15 pp., 8 figs. Washington, D. C., October 30, 1916. (5 pp. in Institute Bulletin.)

177—**Aebi High Pressure Liquid Manure Pump.**—*La Terre Vaudoise*, 8th Year, No. 45, pp. 363-364, 2 figs. Lausanne, Nov. 4, 1916.

The gravity system of distributing liquid manure over the fields of a farm by means of a conduit necessitates the placing of of the farm buildings on the high land, which is not always practicable.

The new pump constructed by the firm of Aebi & Co., at Berthoud, Switzerland, allows of treating, with little trouble and

small expense, land situated as high as 150 feet and even 300 feet above the farm house. The liquid is forced through a conduit into a reservoir situated on the high land. Connections, too, may be fixed at various levels to the main pipe, or on lateral branches. By attaching hempen tubes with nozzles it is possible to water several pieces of land in succession while the pump is at work. The reservoir may be filled by working the motor at any odd time, and the liquid distributed by gravity.

The pump is driven by a toothed gear run from fixed and free pulleys, and may be worked from the ordinary farm motor. A farmer who has installed one on his property estimates its capacity to be 44 gallons per minute with 3 HP motor and 1300 feet of 75 mm. tubing.

The Aebi pump would be useful for the direct distribution of liquid manure on uniformly level land or even for reaching higher land, and in conjunction with a reservoir when the differences in level are more important. It will considerably lighten the cost of carting and distribution, especially on the higher parts of the property.

272—**The "Cataract", Root Washer and Peeler.**—*The Implement and Machinery Review*, Vol. 42, No. 501, p. 1014, 1 fig. London, January 1, 1917.

273—**Hinman Mechanical Milkers.**—*Farm Implement News*, Vol. XXXVII, No. 49, pp. 30-31, 1 fig. Chicago, Ill., December 7, 1916.

RURAL ECONOMICS

276—**The Normal Day's Work of Farm Implements, Workmen, and Crews in Western New York.**—MOWRY, H. H., in *United States Department of Agriculture, Bulletin No. 412* (Professional Paper of the Office of Farm Management). Washington, D.C., September 22, 1916. (12 pp. in Institute Bulletin.)

The office of Farm Management of the United States Department of Agriculture has published the results of information obtained from farmers in Wayne, Ontario, Monroe, Tennessee, Livingstone, Orleans and Niagara counties. The information is given in the Institute Bulletin in twenty-nine tables. The first table gives a summary with comparison of the average daily work accomplished by the principal farm machines, and the work done by each man

in the course of the different agricultural operations. Then follow a number of tables giving the data for a fair day's work for walking and sulky ploughs, spike-tooth and spring tooth harrows, disk harrows using teams of two, three and four horses respectively, land rollers, for men setting up grain in shocks after the binder, crews threshing wheat from shock, average crews threshing wheat and oats from stack or barn, handling manure with a manure spreader, planting corn with implements, cultivating corn, one man cutting corn by hand, a man setting up corn after the corn binder, husking corn from shock, operations in bean growing, making, hauling and unloading hay, operations in cabbage growing, pruning fruit trees, and picking and packing fruit, and hauling fruit to the market.

AGRICULTURAL INDUSTRIES

184—**Compulsory Degerming of Maize in Hungary.**—KOZTELEK, Year 26, No. 45, pp. 1588-1590. Budapest, November 4, 1916.

A Government Order dated Nov. 1, 1916, imposes obligatory removal of the germs from maize grains and gives the rules to be adopted for effecting the same. The order further contains measures for regulating the trade in maize germs, extraction of oil, sale and maximum prices. According to the provisions of this order all stone mills and establishments for the milling of maize are obliged to remove the germs and to carry all operations according to instructions of the "National Union of Credit." The mills may not extract more than 12 lbs. of germs per 100 lbs. of maize, and the quantity of oil expressed must be at least 15 lbs. per 100 lbs. of germs. This order only concerns stone mills, especially those which, thanks to the aid of the above-mentioned union, are in a position to complete the alterations which the Union requires for the process in question. Details are given in the article in the Institute Bulletin.

279—**The Sugar Industry in Russia.**—KRIOUKOV, N. A., in *The Agricultural Gazette*, Nos. 35 to 41, pp. 945-948; 976-978; 998-1000; 1018-1020; 1041-1043; 1065-1066; 1085-1086. Petrograd, 1916. (4 pp. in Institute Bulletin.)

186—**Some New Constituents of Milk. The Distribution of Phosphatides in Milk.**—OSBORNE, THOMAS B., and WAKEMAN, ALFRID J., in *The Journal of Biological Chemistry*, Vol. XXVIII, No. 1 pp. 1-9. Baltimore, Md., December, 1916.

187—**The Dairying Industry of England and Wales.**—GAVIN, W., and MACKINTOSH, J., in *The Journal of the Board of Agriculture*, Vol. XXIII., No. 6 pp. 593-597. London, September, 1916.

Supplement No. 16 of the present number of the Journal of the Board of Agriculture contains two papers which, together constitute a valuable survey of the dairying industry in England and Wales.

The first paper, by W. Gavin, opens with an historical survey of the dairying industry in the last half century, and draws attention to the rapidly increasing volume of the fresh milk trade.

The number of cows and heifers in England and Wales increased from 1,952,648 head in 1881-1885 to 2,484,220 head in 1914; an increase of some 30 per cent., as against an increase in the population of

the country of 60 per cent since 1871.

The greatest increase in dairying has occurred in dairying districts.

The author next deals with the railway milk traffic of the various railway companies, with special reference to the London milk trade. The figure obtained for the total railway milk traffic of London is 91,700,000 galls., and this, added to a road traffic of 15,000,000 galls. and the produce of the London dairies—1,200,000 galls—gives the total milk supply of London as approximately 108,000,000 galls.

The Midland towns of Lancashire, Cheshire, Warwick, Stafford and the West Riding take something over 50,000,000 galls., the North-East Coast takes 11,000,000 galls., the South Wales mining area 4,000,000 galls., the South-East Coast and district 4,500,000 galls., and the South Coast 5,750,000 galls.

With 92,000,000 galls. taken to London and 100,000,000 galls. elsewhere, the total handled by English railways does not exceed 200,000,000 galls.

The total consumption of milk was estimated as 731,000,000 galls. in 1908, so that about one quarter of the milk consumed in England and Wales is transported by railway.

Many consignments are made from great distances; in 1911 the G.W.R. brought 1549 churns from St. Erth, Cornwall, 320 miles to London, while the most distant point recorded by the L. & N.W.R. for London milk traffic is Toom (Ireland) 513 miles from Euston Station. A valuable summary of the railway traffic is given in an appendix in which the principal consuming and producing areas of the various lines are shown, where possible.

The share taken in the industry by the various countries, and the conditions obtaining in these countries are next considered. It is emphasised, (1) that the basis of Dairying in England and Wales is now the fresh milk trade; (2) that cheese-making, though still carried on in some districts, is, generally speaking, only continued (a) in district where lack of transport encourages it, or (b) as a means of utilizing a surplus or flush of milk when prices are low; (3) that butter making, with the exception of that in the Cornish factories, is a rapidly diminishing industry in England and Wales.

On the basis of the figures given in the Board's report on the agricultural output of Great Britain, the total milk production of England and Wales is placed at 1,071,000,000 galls. With regard to the consumption of milk, that for the whole of England and Wales is placed at 22 ¼ galls.,

CLASS	Per Gallon of Milk			Per 100 lb. of Milk			Per 1 lb. of Butter-Fat		
	I	II	III	I	II	III	I	II	III
	d.	d.	d.	d.	d.	d.	d.	d.	d.
<i>Value of Manurial Residue and Gross and Net Cost of Food:</i>									
1. Gross cost of food	4 83	3 72	4 14	46 89	36 11	40 19	12 34	9 50	10 58
2. Value of manurial residue . .	0 35	0 26	0 38	3 40	2 52	3 69	0 90	0 66	0 97
3. Net cost of food	4 48	3 46	3 76	43 49	33 59	36 50	11 44	8 84	9 61
<i>Summary of Overhead Charges:</i>									
4. Labour	1 60	1 30	1 42	15 53	12 62	13 78	4 09	3 32	3 62
5. Depreciation and loss	1 47	0 37	0 73	14 27	3 59	7 09	3 75	0 94	1 86
6. Interest on capital	0 42	0 36	0 39	4 07	3 49	3 78	1 07	0 92	1 00
7. Depreciation of dairy utensils and food machinery; oil and coal, veterinary charges, medicine and sundries	0 37	0 31	0 36	3 59	3 01	3 49	0 94	0 79	0 92
8. Keep of bull	0 22	0 18	0 20	2 13	1 74	1 94	0 56	0 46	0 51
Total	4 08	2 52	3 10	39 59	24 45	30 08	10 41	3 43	7 91
<i>Summary of Transit Charges:</i>									
9. Keep and depreciation of milk, cob, upkeep of milk cart, railway churns, etc	0 21	0 44	0 42	2 04	4 27	4 08	0 54	1 12	1 07
10. Railway carriage		1 04	0 78		10 10	7 57		2 66	1 99
Total	0 21	1 48	1 20	2 04	14 37	11 65	0 54	3 78	3 06
Cost of production to the farmer	8 78	7 46	8 06	85 12	72 41	78 23	22 39	16 05	20 58

and that for London as 15 galls., per head. The paper concludes with a survey of the imports and exports of dairy produce

The second paper, by J. Mackintosh, deals with the average costs, not merely of food in the production of milk, but also of various overhead charges and transit charges, the former including charges in respect of labour, depreciation (on live and dead stock) interest on capital and keep of bull; and in connection with the cost of food due attention has been paid to the value of the manurial residues of the foods consumed. The farms to which the investigation related were situated throughout the county of Bucks and in parts of

the counties of Berks, Oxford and Middlesex.

The costs are given for three different types of farms; Class I—Suburban farms; Class II.—Farms almost entirely grass land with very little arable; Class III.—Farms chiefly grass land, but with a fair acreage of arable.

The following table shows for the three types of farms, the gross cost of food, the value of the manurial residue, the net cost of food, the overhead and transit charges:—

The division of the gross cost of food between the various kinds of foods is as follows:—

	Roots	Hay	Straw	Wet Grains	Cakes and Meals	Pasture and Aftermath
	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent	Per Cent
Class I	17 8	13 4	7 6	12 5	30 3	18 4
Class II	12 5	23 2	6 2		35 0	23 1
Class III	16 6	15 5	6 2		45 2	16 5

The average yields per cow were: from farms in Class I., 650 galls.; Class II., 640 galls.; Class III., 660 galls. In working out the above costs no charge was made for the supervision by the farmer or bailiffs. The paper concludes with a brief summary of the results obtained by other investigators. These figures based on a small area under the war conditions, cannot be regarded as of universal application, but are useful in supplying farmers with a method by which they can work out their own costs, and thus examine their practice closely where they find their costs

exceeding the average figure given in the paper.

286—**Meat Production and Trade in the United States and Other Countries.**—HOLMES, GEORGE K., in *United States Department of Agriculture, Office of the Secretary, Report No. 109*, pp. 1-307. Washington, July 3, 1916.

The United States is the most prominent nation in the production and consumption of meat. Nevertheless, here, as in most other countries, the cattle are hardly increasing in number, sheep are declining,

and swine are increasing. If comparison be made with the increasing population, sheep are far from maintaining their numbers, in some small degree cattle are failing to do so, but in the case of swine, there has been some gain above population in recent years, although a small one.

The number of cattle in 1907 was 72,534,000; it fell to 56,500,000 in 1913, but there was a perceptible increase in 1916, when it was estimated at 61,441,000.

The number of sheep has fallen from 52,500,000 on April 15, 1910, to 49,200,000 in 1916. The swine have increased from 58,200,000 on April 15, 1910, to 68,000,000 in 1916.

The countries producing much surplus meat are Argentina, Australia, Canada, Denmark, Mexico, New Zealand, the United States and Uruguay. There are other countries that have a relatively small surplus: Paraguay and Madagascar, for instance, and many others which export relatively little, while importing more, for example, Germany and Italy.

Substantially, the world's export trade in meat and meat products is maintained by 9 countries. The total of these exports for these countries reached their highest amount, 3,861,000,000 lbs., in 1912. This great quantity after deducting about 500,000,000 lbs. for mutton, was divided between beef and pork in the ratio of about 52 per cent beef and 48 per cent pork, which latter figure shows a tendency to rise.

The export trade of the 9 surplus countries only amounted, in 1912, to about 7.7 per cent of the production of the whole world (without China), which is estimated at about 50,000,000,000 lbs. Argentina and Uruguay together exported 36 per cent of the world's export of meat and meat products in 1912; the United States 31.1 per cent; Australia and New Zealand combined 18.7 per cent; and these three great export sources provided 90 per cent of the world's total. In 1912, $\frac{3}{5}$ of the world's export trade in beef and its products belonged to Argentina, about $\frac{1}{5}$ to the Australasian Colonies, and $\frac{1}{7}$ to the United States; $\frac{3}{4}$ of the exports of pork and pork products go from the United States, about $\frac{1}{5}$ from Denmark, and about $\frac{1}{20}$ from Canada. The mutton export trade is mostly confined to the two Australasian Colonies and to Argentina, the former contributing $\frac{3}{4}$ and the latter $\frac{1}{4}$.

The United Kingdom is the most prominent meat-importing country, and in normal times obtained from surplus countries about 40 per cent of its consumption. Germany held the second place, mostly because of fats and oils, and for the same reason Holland held the third place. In 1913, the United States became the fourth importer of meat and meat

products among the importing countries, but these imports are mostly chilled and frozen beef, with some mutton from South America and Australasia.

Meat and its products only represent a very small part of the calories consumed by the world's peoples, for vegetable products, cereals, sugars and fats must be taken into account. A few countries, comparatively, consume the bulk of the world's meat, and the chief of these, the United States, is also the principal producer.

The total meat production of the United States in 1900, was estimated at 16,226,000,000 lbs., and in 1909 it reached 16,940,000,000 lbs. If the extra-edible parts are added, these figures would amount to 18,865,000,000 lbs. for 1900 and 19,712,000,000 lbs. for 1909.

In 1900, the mature cattle slaughtered in the United States were 46.1 per cent of the stock of cows, and in 1910, 42 per cent. The sheep slaughter, in 1900, was 44.9 per cent of the stock of ewes, and in 1910 it was 46.1 per cent. In 1900, the slaughtered swine were 79.8 per cent of the total stock of swine on hand, and 76.9 per cent in 1910.

If the total meat production is divided among the 500 millions of persons who usually consume this form of food, the per capita average is 93.3 lbs. per year.

In the United States the amount per capita was 181.5 lbs. in 1900, and 170.6 in 1909. This is by far the highest consumption per head, except in Australia and New Zealand, where it amounted to 263 and 212 lbs. respectively.

The total consumption of meat and meat products in the United States in 1900, is estimated at 13,792,000,000 lbs., and in 1909 at 15,450,000,000 lbs. In 1913 Germany consumed 7,399,000,000 lbs. Russia (without Poland) 6,024,000,000 lbs. in 1899, the United Kingdom 5,714,000,000 lbs. in 1906, and France 3,096,000,000 lbs. in 1904. In 1914 and 1915 the United States imported 2.6 and 2.7 per cent respectively of their total beef and mutton consumption, including calves. The surplus of all the meat and meat products in the United States was 917,000,000 lbs. in 1914 and in 1915.

The losses of meat animals in the United States from disease and exposure are enormous. Since 1900, from 1,100,000 to 1,475,000 cattle have been lost from disease annually, and from about 600,000 to 1,500,000 cattle have been lost annually from exposure since 1889. Sheep losses from disease have been about the same as cattle, while the swine losses have varied from a minimum of 2,200,000 head in 1894, to a maximum of 7,000,000 in 1914, they are mainly due to hog cholera.

The prices which have been compiled for producing and consuming countries show an upward trend of prices of meat and meat products. The few exceptions that have been observed are inconsiderable, and indicate that in these instances the country is, for some special reason, unaffected by the world-wide conditions that are so prominently verified in these price compilations.

The general fact is that meat production has not kept pace with the increased population and the consumers' demand. The inevitable measure of this changed relationship is price. Increasing cost of meat production is a factor in the rise of prices. The United States are not alone in the decline of meat production per head, but are participating in a world-wide movement.

A careful study has been made of the conditions of the Chicago market; the resulting report contains comparisons between the average prices paid from 1893-1897 and those given in 1914 for animals bought at the farm and at the Chicago market respectively. Cattle, sheep and swine are included.

In the preparation of this report, a separate study was made of the meat producing conditions in 13 countries: Argentina, Australia, Brazil, British South Africa, Canada, Chile, Colombia, Denmark, Madagascar, Mexico, New Zealand, Paraguay and Uruguay. The assembled facts indicate that gradually and at some indefinite future time, Southern Brazil may rival Argentina in meat production; Mexico should eventually produce millions of cattle yearly, Argentina and Uruguay could greatly increase their beef production and Paraguay may follow. Climatic and hydrographical conditions present formidable obstacles to further extension of cattle and sheep rearing in Australia, but to some extent they may gradually be overcome. Rhodesia has an extensive range area that will yet produce great numbers of cattle, and there are other parts of British South Africa which could largely increase their production.

Further, in many places, sheep may undergo a change from almost exclusive wool production to a production of mutton and lamb as well, or perhaps to the subordination of wool.

In Canada, the extension of meat production is increasingly a problem of farm management.

An extraordinary combination of circumstances and factors in all countries, or even in a considerable number of them, to cause a rapid increase of the production of meat is not to be expected, rather, as a net result, gradual growth and extension which may, or may not, equal the rate of increase of the meat-eating population.

The value of cattle, sheep and swine on farms and ranges in the United States on January 1, 1916, was over \$3,332,000,000.

The value of the farms and farm property with live stock as a principal source of income in 1910 was over \$15,000,000,000. The value of the capital of whole-slaughtering, and meat-packing, lard-refining, and oleomargarine establishments in 1910 was over \$338,000,000.

In 1910, 32.4 per cent of the population of the United States was agricultural, this proportion was 77.5 per cent in 1840, 47 per cent in 1870, 39 per cent in 1890 and 35 per cent in 1900.

Agricultural labour, as devoted to the production of crops, has in these last decades, gained greatly in effectiveness by means of improved machinery, implements and processes. This permits of a relative decline in the agricultural population, as far as crop production is concerned, but it is a question whether this applies in the same degree to meat animal production. The consumption of crops per head has long increased, and the consumption of meat per head has decreased. The displacement of meat in the dietary by products of the vegetable kingdom advances slowly but surely in the United States.

The report contains 30 tables of statistics and 32 diagrams.

PLANT DISEASES

290—"False Blossom," a Disease of Cranberry (*Oxycoccus macrocarpus*) in the United States of America.—SHEAR, C. L., in *The United States Department of Agriculture, Bulletin* 444, 8 pp., 2 fig., 4 pl. Washington, D.C., 1916.

198—*Verticillium albo-atrum*, Causing the Verticillium Disease of the Potato in Ireland.—PETHYBRIDGE, G. H., in *The Scientific Proceedings of the Royal Dublin Society*, New Series, Vol. 15, No. 7 pp. 63-92, Pl. II-III Dublin, 1916.

The disease caused by *Verticillium albo-*

atrum Reinke and Berthold (*Verticillium* disease of the potato) is one which results in the more or less premature death of the plant, the general symptoms exhibited being those of a process of gradual desiccation.

The disease does not appear to be very common in the British Isles, and the losses due to it are at present probably not large; but should it become prevalent, the losses might be severe. The most satisfactory preventive measures are to maintain a proper rotation of crops, and to take steps to ensure that the potatoes used for seed purposes are healthy.

INJURIOUS INSECTS

206—The Effect of Hydrocyanic Gas Fumigation on the Eggs of *Aphis pomi* and *A. avenae*, Apple Parasites, in Ontario.—ROSS, W. A., in *The Canadian Entomologist*, Vol. XLVIII., No. 11, p. 367. London, 1916.

The fumigation of young apple trees with hydrocyanic acid gas just before or shortly after the buds commence to swell not only controls the San José scale (*Aonidiella perniciosus* = *Aspidiotus perniciosus*) but it also destroys the eggs of aphids.

In the spring of 1914, out of seven apple trees obtained from a nursery and well stocked with eggs of *Aphis pomi* and *A. avenae*, three were fumigated with hydrocyanic acid gas (1 oz. KCN to 100 cu. ft., 1:1:3 formula) for 45 minutes and the others used as controls. None of the eggs on the fumigated stock hatched, whereas large numbers hatched on the control trees.

The experiment was repeated in the spring of 1916, and the same satisfactory results were obtained—100 per cent of the aphid eggs were destroyed.

In 1914 and in 1916, the nursery stock was fumigated 8 days and 6 days respectively before the eggs on the control trees commenced to hatch.

209—*Tortrix oleraceana* n. sp., a Microlepidopteron Injurious to Cabbage in Newfoundland, N. America.—GIBSON, ARTHUR, in *The Canadian Entomologist*, Vol. XLVIII., No. 11, pp. 373-375, Pl. X. London, 1916.

In July, 1915, in some farms near St. Johns, a large number of small tortrix caterpillars were noticed infesting cabbage leaves. In one farm they completely destroyed the first planting and a large part of the second.

On breeding out the larvae, it was found

that it was not the European species *Tortrix wahlbomiana* L. var. *virgaureana* Tr.—although the latter insect has much affinity with that under discussion—and similarly it was not identical with any of those species described for North America. So the author proposes the name of *T. oleraceana* n. sp., for the insect which he also describes systematically. During 1916, this insect has caused severe injury in Newfoundland; caterpillars sent have proved, on breeding out, to belong to the new species in question.

297—*Cassida pallidula* ("Egg plant Tortoise Beetle,") Parasitic on the Egg-plant and the Potato in Louisiana (United States).—JONES, T. H., in *United States Department of Agriculture, Bulletin* No. 442, pp. 1-8, fig. 1-3. Washington, D.C., October 2, 1916.

299—The Pear Leaf-Worm (*Gymnonychus californicus* Marlatt), A Hymenopteron Injurious to the Leaves of the Pear Tree in the United States.—NOUGARET, R. L., DAVIDSON, W. M. and NEWCOMER, E. J., in *United States Department of Agriculture Bulletin* No. 438, pp. 1-24, fig. 1-4, Pl. I-II. Washington, D.C., December 11, 1916.

300—*Laspeyresia molesta*, an Important New Insect Enemy of the Peach and of Other Fruit Trees in the United States.—QUAINTANCE, A. L., and WOOD, W. B., in *The Journal of Agricultural Research*, Vol. VII., No. 8, pp. 373-383, Plates 26-31. Washington, D.C., November 20, 1916.

301—*Plectrodera scalator*, a Coleopteron injuring *Populus deltoides* and *Salix alba*, in the United States.—MILLIKEN, F. B., in *United States Department of Agriculture, Bulletin* No. 424 (Professional Paper), pp. 1-7, figs. 1-3, pl. I. Washington, D.C., November 9, 1916.

FOREIGN CROP CONDITIONS

THE August number of the *International Crop Report and Agricultural Statistics* furnishes data on the conditions of crops on August 1st. The information is here summarized.

As the harvest takes place in the different countries of the Northern hemisphere, the respective governments transmit to the International Institute of Agriculture in Rome, various details either as to yields, or as to the figures that they are accustomed to employ for expressing the condition of their crops. These figures are indications from which the size of the crops can be estimated, until threshing provides a more accurate basis of calculation.

In Northern Europe especially in Denmark there are complaints of excessive heat and continuous drought resulting in delayed development of spring crops, and damage to the winter sown areas. A reduction of one-third to one fourth from the average yield is anticipated for the greater part of the Danish cereals. In Sweden it is believed that the yield will be below average by about 15 per cent for

wheat, 10 per cent for rye, and 5 per cent for barley and oats.

For Central Europe, we may refer to the most recent information which is that from Switzerland, where the month of July has somewhat improved the outlook, so that an average yield may be expected, excepting for rye, which suffered too much during the severe winter. Maize, on the other hand, looks well in all respects.

In Western Europe, it is considered that the month of July has brought about a decided improvement in the condition of the cereal crops. Taking Great Britain as a whole, the condition is very nearly average, and, taking into account the increased acreage of this season, a yield rather over average may be looked for.

As regards Southern Europe, Italian crops show some signs of injury caused by the excessive heat in June, but the July rains were of great service to such crops as were still standing, especially to maize.

Following are the latest figures for the production of cereals in the countries which have sent reports to the Institute.

COUNTRIES	1917	1916	Five Years' Average, 1911-15
	Bushels	Bushels	Bushels
<i>Wheat—</i>			
Spain	141,000,000	152,330,000	125,214,000
France	161,670,000	214,622,000	296,304,000
Ireland	4,347,000	2,827,000	1,834,000
Canada	249,165,000	229,313,000	254,965,000
United States	668,000,000	639,886,000	803,513,000
India	379,307,000	318,005,000	360,550,000
Japan	26,533,000	28,307,000	24,638,000
Algeria	29,715,000	29,152,000	35,000,000
Totals . .	1,659,737,000	1,614,442,000	1,902,018,000
<i>Rye:—</i>			
Spain	27,779,000	28,782,000	25,147,000
Ireland	222,000	192,000	228,000
Canada	4,195,000	2,967,000	2,326,000
United States	56,000,000	47,000,000	41,398,000
Totals .	88,196,000	78,941,000	69,099,000
<i>Barley:—</i>			
Spain	76,497,000	86,864,000	74,119,000
Ireland	7,872,000	6,537,000	7,264,000
Canada	59,318,000	42,647,000	47,805,000
United States	204,000,000	181,000,000	197,000,000
Totals	347,687,000	317,048,000	326,188,000
<i>Oats:—</i>			
Spain	31,104,000	30,272,000	28,311,000
Ireland	79,464,000	58,685,000	61,000,000
Canada	399,843,000	365,553,000	399,644,000
United States	1,533,000,000	1,252,000,000	1,230,000,000
Totals . . .	2,043,411,000	1,706,510,000	1,718,955,000

Broomhall's foreign crop cable issued on September 18th, is as follows:—

United Kingdom.—Weather is unseasonably cool and wet. Threshing is slow and yields of all grain disappointing. Stocks of foreign wheat and oats liberal and weekly arrivals continue adequate. Season's requirements will undoubtedly be taken care of.

Russia.—Weather cold and wet. Harvesting is mostly finished, with yields disappointing. Seeding for winter crops small. Interior movement light, as scarcity is noted and prices high. Port stocks light.

Scandinavian Peninsula.—Weather is unseasonably cold and wet. Threshing is revealing small yields of inferior quality. Stocks of all grain are light and import needs large. Great economy is being practiced in usage, but grave apprehension is felt for winter supplies owing to the restriction on imports.

Balkan States.—Crops were gathered in good condition and yields better than expected. Bulgaria's yield was large and Roumania better than expected. Central

powers importing good quantities.

North Africa.—Crops yielded well and quality good. Corn is a good crop.

Spain.—Harvesting and threshing is finished, with weather favorable and yield large. Import needs will be small.

Australia.—Weather favourable. Our Sydney agent confirms a decreased wheat acreage. Stocks keep large.

Argentine.—All advices received here by leading interests confirm a highly favourable outlook for wheat and oats.

France.—Weather is unfavorable for late harvesting and threshing and this work is delayed by scarcity of labor. Yields are good on area seeded but the crop is small as compared with normal. Import needs will be large and foreign wheat is in moderate supply as consumption has been liberal.

Italy.—Harvesting is about finished and threshing is progressing slowly, with weather unfavorable and labor scarce. Yield of wheat moderate and under earlier expectations. Quality of all grains fair. Importation will be large despite economy, and foreign arrivals are moderate.

INTERNATIONAL YEAR BOOK OF AGRICULTURAL STATISTICS

THE International Year Book of Agricultural Statistics 1907 to 1916 will be issued shortly. This is the most complete work on agricultural statistics in existence, being the results of research of the widest scope and at the same time of the most minute detail yet undertaken in this direction. The statistics include yield, trade, and consumption, all during the last ten years, for the principal agricultural products, comprising among others, cereals, potatoes, sugar, oilseeds, coffee, cocoa, cotton, rubber, textiles, tobacco, etc. The Year Book includes also international statistics in much detail for live stock as well as for fertilisers and chemical products used in agriculture. A special chapter is reserved for the prices of the principal products enumerated, comprising quotations on spot for forward delivery and futures,

together with rates of ocean freight and of exchange. This important work is indispensable for those entering upon a study connected with agriculture in any aspects, or with trade in its products. It is entitled to a definite place on the desk of the economist, the merchant, the manufacturer, the politician, in fact of every one interested in the development of popular well-being.

The International Year Book of Agricultural Statistics comprises about 1,000 pages 8vo: subscriptions (10 francs, postage free) may now be forwarded to the International Institute of Agriculture, Rome. (Subscriptions and publications department).

This work is published in French only, but contains a translation into English and other languages of an elaborate analytical index, enabling the statistical matter to be easily understood.

CONSUMPTION OF CEREALS IN TROPICAL COUNTRIES

A study of various official statements from commerce reports in relation to some of the West Indian and Central American states and colonies show that in most cases the quantities of cereals imported are likely to have been much restricted by the high prices and difficulties of transport. We find in the case of the island of Trinidad that efforts are made to encourage the use of bread made from two parts of banana flour and one part of wheat flour, and this product appears to be adopted also in British Guiana.

In Venezuela the authorities have offered valuable premiums to farmers who shall produce the largest crops of rice, maize or beans, and the last crop gathered proved to be the best for many seasons, so that Venezuela has an actual surplus of beans and maize for export, and endeavours are made to find a market.

In Honduras a concession for the manufacture of banana flour has been granted by the government, although it was noted

that at the normal prices for wheat flour the large banana companies had not found such a manufacture profitable. The export of cereals is prohibited. In Ecuador, where wages have not increased, the labouring classes can purchase only the very cheapest foods obtainable, rice and bananas forming the principal articles of diet, with imported flour at a prohibitive level of price.

On the other hand, Cuba has been very prosperous on the great sugar output which sold at the highest average price in the history of the Republic. The imports showed large gains, which extended also to the cereals, though as they are stated in values, the increase in tonnage was probably much less considerable than the figures would indicate; 1916 imports of cereals were nearly three times those of 1915 in money value.

In the Philippine Islands, with the continuance of war prices for wheat, the import trade in flour during 1916 was the smallest since 1909.

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DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

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CONTENTS.

	PAGE
The New Minister of Agriculture.	935

PART I

DOMINION DEPARTMENT OF AGRICULTURE

The Dominion Experimental Farms:—	
The Division of Chemistry:	
Seaweed as a Fertilizer, by B. Leslie Emslie.	936
The Division of Botany:—	
Prevention of Field and Storage Rot of Potatoes by Bordeaux Mixture, by Paul A. Murphy	942
An Appreciation	945
Order in Council Regarding Grain in Potable Liquors.	945
The Entomological Branch:—	
The Western Cedar Borer, by R. N. Chrystal.	946
The Health of Animals Branch:—	
Export Regulations of Canadian Sheep	950
Dourine and its Control, by W. L. Hawke	950
The Seed Branch:—	
The Seed Purchasing Commission, by Geo. H. Clark.	953
The Live Stock Branch:—	
A Bacon Production Campaign	955

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Farm Loans and Land Settlement:—	
Nova Scotia, by Arthur S. Barnstead	956
New Brunswick, by W. R. Reek	956
Quebec, by J. Antonio Grenier	957
Saskatchewan, F. H. Auld.	958
British Columbia, by Maxwell Smith	959
Quebec:—	
Agricultural Work at the Quebec Military Hospital, by A. Desilets.	960
The Royal Agricultural Schools	960
How to Regenerate Agriculture, by J. H. Lavoie.	961
Ontario:—	
A Rural Social and Business Survey in Peel County, by Justus Miller.	964
Increase of Hog Production—A Practical Proposition.	967
Premiums for Stallions, by R. W. Wade	968
Experiments with Lime, by Robert Harcourt	969
Fruits for Military Hospitals	969
Manitoba:—	
Better Farm Homes, by L. J. Smith.	970
The Use of the Farm Tractor, by L. J. Smith.	970
To Import Breeding Sheep	971
Saskatchewan:—	
Activities of the Department of Agriculture	972
Co-Operative Poultry Marketing	972
Live Stock Distribution	972
British Columbia:—	
The University and Agricultural Instruction, by L. S. Klinck, Dean of the College of Agriculture	973
Stallion Enrolment in Canada	974

PART III

RURAL SCIENCE

Nova Scotia:—	
Rural Science Teachers and School Gardens, by A. H. McKay.	975
Rural Science Activities, by L. A. DeWolfe	976
Rural School Consolidation	976
Ontario:—	
Examination at School Fairs, by E. K. Hampson.	976
New Brunswick:—	
Agricultural Instruction, Normal School, Fredericton, by R. P. Gorham.	978
Quebec:—	
Macdonald College:	
School Lunches in Rural Districts, by Jeannette Babb.	978

Manitoba:—	
Boys' and Girls' Clubs and the Public School, by S. T. Newton	981
Saskatchewan:—	
An Example of School Ground Improvement, by Bert A. See	983
Boys' and Girls' Club Swine Contest	984
School Gardening in 1917, by A. W. Cocks	985
British Columbia:—	
Agricultural Course at Victoria High School, by J. W. Gibson	987

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, PUBLICATIONS AND NOTES

The Food Control Commission	988
Acts Relating to Agriculture:	
Drainage in All its Phases	989
Organization for Marketing Fruits and Vegetables, by Fred H. Grindley	991
Farm Loans in the United States	991
National Service Leagues in Nova Scotia	992
United States Live Stock Industries Commission	993
Associations and Societies:—	
The International Soil-Products Exposition	994
Hamilton Horticultural Society—Protection of Birds	995
The Western Canada Irrigation Association	996
The Western Canada Live Stock Union	996
New Brunswick Agricultural Societies United	996
Pomological and Fruit Growing Society of Quebec	996
The Entomological Society of Canada	996
The Ontario Provincial Winter Fair	997
Ontario Dairy Conventions	997
Women's Institutes of Ontario	997
Saskatchewan Live Stock Association	997
Ontario Bee-Keepers' Association	998
District Conventions of the Saskatchewan Grain Growers' Association	998
Saskatchewan Swine Breeders' Association	998
The Saskatchewan Winter Fair	998
The Alberta Winter Fair	998
The United Farmers of Alberta	998
Baby Beef Competition for Boys and Girls at the Alberta Winter Fair	999
Alberta Dairy Convention	999
British Columbia Veterinary Association	1000
New Publications	1000
Notes	1002
Index to Periodical Literature	1003

PART V

THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence	1004
Science and Practice of Agriculture	1005
Crops and Cultivation	1005
Live Stock and Breeding	1014
Farm Engineering	1016
Agricultural Industries	1018
Plant Diseases	1018
Injurious Insects	1019
Injurious Vertebrates	1019
Agricultural Economics	1020
The Activity of the Belgian Boerenbond in 1915	1020
The American Society of Equity	1022
Contents of the Institute Economic Bulletin	1022
Agricultural Statistics	1023
United States October Crop Report	1024
Broomhall's Foreign Crop Report Summary	1024
Exports of Meats and Animal Products from Argentina	1024
Exports of Chilled and Frozen Meat from Brazil	1025
Exports of Meat and Animal Products from Australia	1025
Exports of Frozen Meat and Animal Products from New Zealand	1025
Live Stock Statistics	1025

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THE NEW MINISTER OF AGRICULTURE



THE HON. T. A. CRRERAR
Minister of Agriculture

ON the formation of a Union Government the Honourable Martin Burrell, who had been Minister of Agriculture in the Cabinet of the Right Honourable Sir Robert Borden since 1911, resigned and the Honourable Thomas Alexander Crerar consented to assume the office. Mr. Crerar since his earliest days has been actively and practically identified with farming. Born in Perth County, Ontario, in 1876, he accompanied his parents to Russell, Manitoba, in 1881. He received a public school education at Portage la Prairie and afterwards attended the Collegiate Institute there. Until he was nineteen years of age, he helped on his father's farm and then taught school for five years. His next step in life was to take the higher studies at Manitoba College. After finally leaving college he returned to farming, to which in all its branches he gave close application for several years. Always

taking a wide and progressive view of public affairs and matters of enterprise particularly affecting agriculture, from the inception of the Grain Growers' Grain Company, Limited, at Winnipeg, he took a warm and active interest in that organization, which he has seen grow from comparatively small beginnings to its present commanding position. In the first year of the Company, he was elected to the Board and almost immediately appointed President, an office to which he was re-appointed on the recent amalgamation with the Alberta Farmers' Co-Operative Elevator Company under the title of the United Grain Growers' Limited, and which he still occupies. Mr. Crerar is also director of the Home Bank and is identified with a variety of other interests.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF CHEMISTRY

SEAWEED AS A FERTILIZER

BY B. LESLIE EMSLIE, C.D.A., F.C.S., SUPERVISOR, INVESTIGATIONAL WORK WITH FERTILIZERS

THE MARINE ALGAE

OF the marine algae, or seaweeds, those of a bright green colour are known as *Chlorophyceae*, the brown as *Phaeophyceae*, and the red as *Rhodophyceae*. To the group *Phaeophyceae* belong the *Laminaria* or kelps and the rockweeds, *Fucus vesiculosus nodosus*, etc., while *Rhodophyceae* includes such familiar forms as Irish or Carrageen moss, *Chondrus crispus*, and Dulse or Dillisk, *Rhodomenia palmata*. Eelgrass, *Zostera marina*—known also as “seaweed”—does not properly belong to the algae.

SOME USES OF SEAWEED

An alkaline dye—probably from *Fucus vesiculosus*—was prepared by the Romans. In northern Europe, Japan, and even on the Atlantic coasts of the United States and Canada, seaweeds such as *Laminaria saccharina* and members of the *Rhodophyceae* find a use as human food, while the rockweeds, *Fucaceae*, are often eagerly eaten by cattle having access to the seashore. Knife handles and other similar articles have been manufactured from the stems of *Laminaria*, while eelgrass is exten-

sively employed as a filling for mattresses. The once flourishing Scottish kelp industry, in which ash, known as “kelp”—valuable chiefly on account of the potash and iodine therein contained—was produced by combustion, represented one of the most successful economic means of utilizing the seaweeds. In recent years, on the Pacific coast of the United States, several companies have established factories on which some progress has been made in the extraction of potash and iodine, by processes of maceration and lixiviation, from the giant kelps which abound in that region.

Another use—the one on which our attention at present converges—is that of seaweed as a manure or fertilizer.

HISTORICAL DATA

The manurial employment of seaweed might be said to almost synchronize with the practice of agriculture. Our records of its use date back to the fourth century, A.D., at which period Palladius, a Roman agricultural authority and writer, refers to seaweed as a substitute for manure.

In Great Britain and Ireland, Scandinavia, on the coasts of Brittany and Normandy, and in Japan, the benefits of seaweed applications to the farm lands adjacent to the sea shore have long been recognized.

It is recorded that a certain Charles Mackintosh, of Crossbasket, near Glasgow, experimented with kelp (ash) on potatoes. A severe frost, in September, injured and blackened every plot to which kelp had not been applied, while the kelp plots remained in perfect foliage.

Experiments conducted by Professor James Hendrick, of Aberdeen, indicated that, weight for weight, seaweed (fresh) gave as large a yield of potatoes as that produced by manure. When acid phosphate was applied along with seaweed, the yield was, in every case, increased, while as a supplement to manure acid phosphate failed to give a corresponding increase. Seaweed with acid phosphate invariably proved more influential than manure with acid phosphate or manure alone. The produce from the manured plots was of somewhat better quality. The addition of acid phosphate, whether to manure or seaweed, promoted maturity of the crops.

METHODS OF USING SEAWEED

Fresh seaweed contains about the same percentage of nitrogen as is present in rotted manure, but less phosphoric acid and more potash. Whereas in rotted manure a certain proportion of the nitrogen is present as ammonium salts immediately available to plants, that of seaweed is all present as organic nitrogen which does not become available until the seaweed has undergone decomposition and nitrification. Seaweed, however, readily decomposes in the soil. Some prefer to facilitate the process by mixing the seaweed with manure and allowing the heap to remain some time before spreading on the land, while others apply the seaweed and plough it

down some months before the crop will require it.

A large proportion of the ash constituents of seaweed is soluble in water. The potash is present therein chiefly as chloride and sulphate of potash—all soluble in water.

SEAWEED-FERTILIZER INVESTIGATION AT CLARKE'S HARBOUR, N.S.

An investigation to determine the feasibility of preparing economically a nitro-potassic fertilizer by the drying and grinding of seaweed was conducted by the writer, under the direction of the Division of Chemistry at Clarke's Harbour, N.S., during the spring and summer of 1915.

The investigation was prompted by a desire to discover a partial substitute for the Stassfurt potash salts—importations of which ceased on the outbreak of the war and was facilitated by the acquisition, through the courtesy of the Department of Naval Service, of the Dog-fish Reduction Works situated on Flat Island, adjacent to Clarke's Harbour, Cape Sable Island, N.S. Here our factory operations were conducted.

Of the Reduction Works machinery only the steam engine and rotary dryer were employed in the seaweed process. The dryer consists of a large steel cylinder—revolving on a horizontal axis—through which a naked flame passes from the wood-burning furnace at one end to the chimney flue at the other. The interior surface of the rotary dryer is fitted with longitudinally arranged shelves which alternately pick up and drop into the flame the material in its passage through the cylinder.

DESCRIPTION OF THE PROCESS

A crew of four men, equipped with a large gasoline launch and two dories, procured the rockweed at low tide, either pulling it by hand or cutting it with knives from the rocks. The round-stalked variety, *Ascophyllum (Fucus) nodosum*, predominate

ated, but a certain proportion also of the flat-stalked rockweed, *Fucus vesiculosus*, was obtained.

The raw material, having been landed on the factory wharf, was spread on specially constructed wooden drying frames—inclined at the most favourable angle to admit the maximum drying influence of sun and wind. As these wharf drying-frames proved inadequate to accommodate all the fresh seaweed, the surplus was spread on the ground surrounding the factory and, to promote its dessication, subsequently treated by a method similar to that employed in hay-making.

A small chain and slat conveyor elevated the air-dried seaweed from the wharf to the feed-table of a large cutting machine, of a type similar to that used for silo-filling, which cut the material into lengths of approximately one inch.

From the cutter the material proceeded by means of a worm-screw to the rotary dryer, already described. On emerging therefrom the now thoroughly dry, crisp, short material was again caught in the trough of a worm-screw conveyor and discharged in the adjoining grinding room. The grinding of the material was accomplished by an attrition plate grinder with a double drive, the plates revolving in opposite directions at a speed of about 2100 R.P.M.

In appearance, the finely ground finished product bears a close resemblance to coffee.

During the brief period of our factory operations about 50 tons of the prepared seaweed fertilizer was produced. Its composition, as ascertained by the analysis of 24 samples, is shown, under the laboratory numbers of 23253, etc., in Table I.

Disregarding overhead charges, and basing our estimates solely on the prices paid for the fresh seaweed (\$1.00 per ton) landed on the wharf, for coal and wood fuel, and for manual labour, the cost of production was approximately \$12.00 per ton.

It may reasonably be assumed that, if operations were conducted on a larger scale, the cost of production would be considerably less than the above estimate.

Unfortunately the operations were seriously impeded by an abnormally wet season, and the complete success of our process depended on a liberal amount of sunshine and drying winds. Such ideal conditions, however, are rarely of long duration in the vicinity of Clarke's Harbour, which is noted rather for its fogs than for its fair weather.

During our most satisfactory day's "run" we were able to put through—in a period of six and a half hours—the equivalent of thirty-five tons of fresh rockweed, which represented rather more than seven tons of the finished product.

In the selection of machinery for our process there was no precedent to guide us, and before the brief period of our experimental factory operations had terminated, various ways and means for increasing the efficiency of the plant suggested themselves.

FACTORS WHICH INFLUENCED THE CHOICE OF RAW MATERIALS

The choice of the rockweeds (*Fucus nodosus* and *vesiculosus* in preference to kelp (*Laminaria saccharina*) was at first induced by the greater accessibility and abundance of the supply and by the exceptionally high percentages of potash present in the samples of the former, collected in April (see laboratory numbers 20906 and 20910 in Table I), but later proved of necessity, owing to the insurmountable difficulties encountered in our attempts to satisfactorily manipulate kelp with the equipment at our disposal.

Unless very thinly spread, kelp, soon after its removal from the water, commences to putrify and, as its moisture evaporates, salts of potash crystallize out, appearing as an efflorescence on the surface of the

leaf. Unlike rockweed which, under favourable conditions, dries rapidly and becomes brittle, kelp dries out slowly and remains gummy—a characteristic which renders its subsequent cutting and artificial drying exceedingly difficult. For these reasons a departure was made from our original intention to utilize kelp—undoubtedly an attractive source of potash—extensively in our process.

Nevertheless, the belief seems warranted that, by a process of lixiviation and subsequent crystallization, the extraction of potash from kelp might prove an economic possibility.

RESULTS FROM FIELD TESTS WITH GROUND SEAWEED

That seaweeds, speaking generally, contain a higher percentage of nitrogen and potash in the winter than in the summer season is a fairly well established fact, which may in a certain degree account for the disappointingly low percentages present in our product, derived, as it was, from rockweeds collected in the months of June and July.

Recognizing, however, that the soil must be appealed to for a final verdict on the fertilizing value of the ground seaweed, the co-operation of a number of farmers, in the Maritime Provinces and Quebec, was secured, the material being used as a fertilizer for potatoes—a crop most likely to respond to a nitro-potassic fertilizer. The plan (see Table II) contained five plots of which No. 1 was a check, No. 2 received ground seaweed at the rate of 1500 pounds per acre, No. 3 the same amount of ground seaweed supplemented by 250 pounds each of acid phosphate and basic slag, No. 4 the phosphatic fertilizer alone, while No. 5 received a complete “chemical” fertilizer consisting of 150 pounds nitrate of soda, 500 pounds of the phosphatic mixture and 100 pounds muriate of potash per acre.

DISCUSSION OF THE RESULTS

Table No. II presents individually the results from eight experiments—selected geographically as examples—as well as the average returns from these and from a total of thirty-six conducted according to the plan described.

The eight experiments cited include the only one undertaken in Ontario—that at the Central Experimental Farm—the results from which must be considered reservedly, owing to the fact that plots 4 and 5—occupying a slightly lower situation than the others—were more seriously affected by exceptionally frequent and heavy rains which occurred during the early part of the season.

Judged by the average returns from thirty-six experiments, ground seaweed alone (Plot 2) gave an appreciable increase and, supplemented by a phosphatic fertilizer (Plot 3), a quite notable increase over the yield from the unfertilized check plot. The omission of seaweed on Plot 4, which received the phosphatic fertilizer alone, resulted in a decreased yield as compared with that from Plot 3, while the complete “chemical” fertilizer (Plot 5) gave the most marked increase. It should be noted however, that in its nitrogen and potash contents, the fertilizer of Plot 5 corresponds to 2000 pounds of ground seaweed. In this respect Plot 5 is favoured and is not comparable, on an absolute basis, with Plot 3, which received but 1500 pounds of the ground seaweed per acre.

CONCLUSION

When normal, pre-war, prices for nitrogen and potash obtained, a ground seaweed fertilizer, such as our product, could not have been prepared and used economically, but, under present existing conditions—commercial potash being practically unprocureable and the cost of nitrogenous fertilizers almost doubled—the possibilities of this source seem to invite further investigation.

TABLE I. ABRIDGED

Analyses of seaweeds chiefly from the Atlantic coast of Canada, including some of those collected during the Seaweed Fertilizer Investigation at Clarke's Harbour, N.S. *Nereocystis luthuana*: Bladder Kelp. *Laminaria saccharina*: Kelp, also known as Ribbonweed or Tangle. *Ascophyllum nodosum* or *Fucus nodosus*: Round-stalked rockweed, known also as cutweed or bladderweed. *Fucus vesiculosus*: Flat-stalked rockweed, known also as cutweed or bladderweed.

Laboratory No.	No. of Samples Analysed	DATE OF COLLECTION	PLACE OF COLLECTION	NATURE OF SAMPLE	ANALYSIS OF WATER-FREE MATERIAL					
					Moisture, Per Cent	Organic Matter, Per Cent	Ash, Per Cent	Nitrogen, Per Cent (N)	Phosphoric Acid Per Cent (P2O5)	Potash (K2O) Per Cent
18993	1	Sept. 18, 1914	Nanaimo, B.C.	<i>Nereocystis luthuana</i> (front) dried sample	0 50.44	60.55	40	3 73	1.44	13 71
19003	1	"	"	<i>Nereocystis luthuana</i> (stem and holdfast) dried sample	12 00	..	..	1 01	0 73	12 87
20108	1	Jan. 4, 1915	Short Beach, N.S.	<i>Laminaria saccharina</i> (whole plant) dried sample	6 08.61	50.38	50	1 65	0 95	12 93
20109	1	"	"	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> (whole plant) dried sample	5 20.46	22.53	78	1 42	0 45	3 85
20906	1	April 27, 1915	Clarke's Harbour, N.S.	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> , fr sh sample.	82 98.74	17.25	83	1 78	0 76	11.42
20909	1	"	"	<i>Laminaria saccharina</i> , dried sample	13 54.66	83.33	17	2 10	1 89	9 63
20910	1	"	"	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> , dried sample	1 64.76	25.23	75	1 68	1.76	13 35
22657	1	July 26, 1915	"	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> , light coloured young plant, fresh sample	71 08.82	01.17	99	0 94	0 57	1 65
22658	1	"	"	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> , dark coloured old plant, fresh sample	74 25.78	43.21	57	1 58	0 71	2 81
23253	24	June and July, 1915	"	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> , dried and ground.	7 11.76	27.23	73	1 04	0 39	2 49
23275	8	April, 1915 to " 1916	"	<i>Laminaria saccharina</i> (front) fresh sample.	88 58.66	56.33	44	1.48	0 95	9 14
22850 etc.	8	"	"	<i>Laminaria saccharina</i> (stem and holdfast) fresh sample	90 43.53	06.46	94	0 94	0.78	20 91
22851 etc.	8	"	"	<i>Ascophyllum</i> (<i>Fucus</i>) <i>nodosum</i> (whole plant, fresh sample	73 69.74	74.25	26	1.02	0.45	3 39
20906 etc.	12	"	"	<i>Fucus vesiculosus</i> (whole plant) fresh sample..	76 68.68	80.31	20	1 38	0.53	3 32
22348 etc.	9	"	"							

*Averages.

TABLE II. ABRIDGED

Results from some experiments with dried ground seaweed on the potato crop, in the year 1916. To ascertain the fertilizing value of a nitro-potassic fertilizer prepared from seaweed.

NAME OF EXPERIMENTER	ADDRESS	FERTILIZERS (IN POUNDS) PER ACRE					INCREASE OVER UNFERTILIZED CHECK PLOT (NO. 1)				
		Plot 1	Plot 2	Plot 3	Plot 4	Plot 5	Plot 2	Plot 3	Plot 4	Plot 5	
		YIELD (IN BUSHELS) PER ACRE					INCREASE IN BUSHELS PER ACRE				
Central Experimental Farm Chas. Drolet Isaac W. Baird A. T. Reid David Bacon. B. C. Fairn. Samuel Freeman A. M. Stuart.	Ottawa, Ont. Ste. Foy, Que. Chipman, N.B. Rollingdam Stn. N.B. Nappan Station, N.S. Annapolis Royal, N.S. Amherst, N.S. Belle River, P.E.I.	No Fertilizer	1,500 Ground Seaweed	1,500 Ground Seaweed, 500 Acid Phosphate and Basic Slag	500 Acid Phosphate and Basic Slag	150 Nitrate of Soda, 500 Acid Phosphate and Basic Slag, 100 Muriate of Potash					
		122 7	143 2	169 8	120 6	115 9	20 5	47 1	2 1	6 8	
		164 3	202 3	204 3	202 3	171 3	38 0	40 0	38 0	7 0	
		227 5	232 5	267 5	237 5	282 5	5 0	40 0	10 0	55 0	
		82 5	165 0	192 5	178 7	192 5	82 5	110 0	96 2	110 0	
		177 6	172 3	212 0	187 0	231 7	5 3	34 4	9 4	54 1	
		50 0	100 0	150 0	120 0	215 0	50 0	100 0	70 0	165 0	
		247 6	323 0	324 6	263 0	300 0	75 4	77 0	15 4	52 4	
		293 3	318 3	315 0	296 7	295 0	24 7	21 7	3 4	1 7	
		170 7	207 1	229 5	200 7	225 5	36 4	58 8	30 0	54 8	
Average returns for the above eight experiments.		166 0	177 2	193 0	183 7	211 5	11 2	27 0	17 7	45 5	
Average returns from thirty-six experiments.											

THE DIVISION OF BOTANY

PREVENTION OF FIELD AND STORAGE ROT OF POTATOES BY
BORDEAUX MIXTURE

BY PAUL A. MURPHY, OFFICER IN CHARGE, FIELD LABORATORY OF PLANT PATHOLOGY,
CHARLOTTETOWN, P.E.I.

ALTHOUGH it is well known that the principal rot causing loss in potatoes both in the field and in the cellar, the late blight rot, often mis-called the "dry rot", is due to the same cause as brings about late blight on the foliage. It is not always realized that spraying the foliage with Bordeaux mixture sometimes derives its principal importance from the prevention of rot developing, during, and subsequent to, digging rather than from increasing the yield by the prolongation of the life of the tops.

GROWTH OF THE POTATO

It is of course of great importance to keep the foliage in a living and active condition as long as possible. All the food which the potato plant manufactures and stores in its tubers is elaborated in the leaves, and the longer the foliage lives and functions the greater will the crop be, other conditions being equal. The importance of prolonging the life of the foliage to the utmost will be better realized if we consider the life history of the plant. In the Maritime Provinces the period of growth of the potato crop, from the time of planting until harvesting, is approximately four months. The first two months are spent in growing the sprouts, roots, stolons, stems and leaves of the plant. This is all in the nature of capital expenditure. It is as though a factory were being built which will in the ensuing two months manufacture about 1 lb. of potatoes. After the lapse of around two months tuber formation begins,

and it continues as long as the plant lives. Theoretically, therefore, every week that the plant lives in vigorous condition after the manufacturing operations commence means an output of about 2 oz. per plant, or slightly more than 31 bushels per acre, the yield being assumed to be 250 bushels per acre. As a matter of fact Jones showed in Vermont years ago that of a total crop of 379 bushels 321 bushels were produced in the last 51 days of a growth period of 125 days, the average weekly in-



A POTATO TUBER CUT OPEN TO SHOW LATE
BLIGHT ROT INSIDE

crease during that time being nearly 45 bushels.

LATE BLIGHT IN THE MARITIME PROVINCES

In the year 1915 there was an

early and very severe outbreak of the late blight all over the Maritime Provinces. Most of the foliage in unsprayed fields, even in the latest parts of the country, was dead by the middle of September, in some sections much earlier, while potatoes which had been thoroughly sprayed with Bordeaux mixture remained green from two to three weeks or more longer. This lengthening of the life of the plants showed itself in experiments carried out at Charlottetown, P.E.I., on three common varieties in an average increase in yield per acre of 97 bushels of marketable potatoes.

The season of 1916 was different in character and different in the way the late blight appeared and acted. The disease never got far enough

ahead in that year as a general rule to kill the tops completely, although it was present on them for from four to six weeks before digging time. In some cases it did an appreciable amount of injury to the leaves, sufficient to be measured by an increased yield in adjoining sprayed plots, in which the foliage remained intact until frost struck or the crop was dug. But several cases were observed in which the use of Bordeaux mixture did not seem to give any increase in yield. In some of these instances it was possible to store the potatoes from the sprayed and unsprayed portions of the field separately, but in the same cellar and under exactly the same conditions, when the results set out below were obtained.

TABLE I. Control of late blight rot of potatoes in field and cellar by spraying with Bordeaux mixture; Variety—Green Mountain.

Treatment	Total yield per acre Bush.	Late blight rot in bush. per acre			Net amnt. of saleable potatoes in May Bush. per ac.	Difference in favour of sprayed plots. Bush. per ac.
		In field and cellar Oct. 1916	In cellar Oct., 1916 May, 1917	Total		
Sprayed	231	0	22	22	209	61
Sprayed	294	1	5	6	288	140
Sprayed	276	0	1	1	275	127
Unsprayed	288	21	119	140	148	

It will be seen from the above table that the use of Bordeaux mixture did not result in an increased yield when the crops were dug. This was to have been expected because the late blight was responsible for little or no damage to the tops, even on the unsprayed portions, although it was generally present there. There did not seem to be any conspicuous reduction in the amount of rot found in the field in certain cases as a result of spraying, but in every case of which we have the records the spraying effected almost complete control of dry rot in storage. This was most evident in the months from October, 1916, to Jan-

uary, 1917, but its good effects were sustained up to the middle of May, 1917. Taking the average of the three sprayed plots there was a loss of less than 10 bushels per acre from late blight rot from harvest time to the following May, while the loss in the check plot during the same period was 140 bushels per acre. The latter figure shows that almost one-half of the crop was destroyed by rot, a very large proportion, but not as large as some of the commercial losses sustained in the same year. Authentic cases are on record in which one-half to three-fifths of the sound potatoes placed in storage were lost owing to late blight rot.

TABLE II.—Control of late blight rot of potatoes in field and cellar by spraying with Bordeaux mixture; Variety—Cumming's Pride.

Treatment	Total yield per acre	Late blight rot in bush. per acre			Net amt. of saleable potatoes in Jan. 1917 Bu. per acre	Difference in favour of sprayed plots Bu. per acre.
		In field and cellar Oct., 1916	In cellar Oct., 1916 Jan., 1917	Total		
Sprayed 6 times	489	1½	0	1½	487½	133½
Sprayed 4 times	442	1½	0	1½	440½	86½
Unsprayed	424	66	4	70	354	

Similar results were obtained on the variety Cumming's Pride at Charlottetown, P.E.I. (Table II). The comparative figures are only available to the month of January because the unsprayed potatoes were not kept any longer, but the potatoes from the two sprayed plots combined were kept until May and the further rot which developed in them amounted to a total of 3½ bushels for the two, or an average of 1¾ bushels for each. Spraying in this case resulted in as nearly perfect control of the late blight rot as is possible commercially, the total loss per acre on sprayed potatoes up to May being only 3½ bushels while 70 bushels of similar unsprayed potatoes had rotted by January.

CONCLUSIONS

Results such as these are likely in years such as 1916 when for certain reasons the blight is not sufficiently severe to kill the foliage completely and the conditions are good for the transfer of infection to the tubers, and they are generally more liable to be obtained where the soil is inclined to be heavy and moist, and in localities in which late blight rot in storage is generally severe. In districts in

which such conditions prevail potato spraying is doubly necessary, and is bound to be doubly beneficial, since it not only increases the yield but also practically eliminates storage rot, as shown by the above experiments, which were carried out under conditions known from previous experience to be very favourable to it. While as a general rule the benefits from thorough spraying are obvious in the field at digging time this does not include the full benefit, which is only seen after the crop has been stored. Whether the crop is stored by the grower or not, the improved keeping qualities will react to the farmer's benefit. In the former case if the grower holds his crop for higher spring prices good spraying will insure him against loss from rot. If he sells in the fall, the great bulk of the crop will still be stored in warehouses and it is the farmer who will eventually suffer if his own potatoes or potatoes from his neighbourhood earn a reputation as poor keepers. Farmers would do well to realize that the trade attaches more importance to keeping qualities than to practically anything else, that the keeping quality largely regulates the price, and that there is an assured market for stock free from danger of rot.

AN APPRECIATION

THE following excerpt from the presidential address before the British Mycological Society, delivered by Dr. E. W. Swanton, Curator of the Haslemere Natural History Museum, contains an appreciation of the work carried on by the Botanical Division which might serve to arouse the greater interest of the general public of Canada in this phase of work at the Experimental Farms:—

The useful mycological notes which appear from time to time in the *Journal of the Board of Agriculture*, are reproduced in leaflet form with an italicised foot note which informs the public that they may be obtained post free on application to the Secretary of the Board of Agriculture and Fisheries. But a system of distribution which depends largely for its success upon the publicity gained through the subscribers to a journal has obvious defects. Personally I much prefer the Canadian plan of posting them to every village in the land. The farmers' circulars, prepared under the direction of the Minister of Agriculture at Ottawa, are distributed

throughout the length and breadth of Canada. I have had many opportunities lately at the Haslemere Museum, of conversing with farmers who have thrown up their occupations—all honour to them—purposely to come over and help the mother country in her time of need, and I gather from them that no expense is spared in their country in the production and distribution of mycological literature. In Canada they do not wait for a dangerous pest to arrive and make itself unpleasantly evident before they begin writing about it, but, if there be a possibility that such may come, a warning circular is sent out broadcast which contains a most excellent coloured illustration and references to a bulletin in which detailed particulars may be read. One stalwart young warrior told me that Circular No. 3 (a warning one which concerns the potato canker) is displayed in post offices in remote districts as well as in provincial towns, and he was proud to mention a certain village with a population of thirty-two which had not been forgotten by the Government. The circulars have a very attractive appearance; clear type and realistic illustrations are used with good paper or cardboard, and points of special importance are emphasized by printing them in red.

The following regulation has been passed by Order in Council under the War Measures Act, 1914:

1. On and after the first day of December, 1917, and until the Governor-General in Council has by Order declared that the present abnormal conditions have ceased, no grain of any kind and no substance that can be used for food shall be used in Canada for the distillation of potable liquors.

2. Any person violating the above regulation shall be guilty of an offence and shall be liable on summary conviction to a fine not exceeding five thousand dollars, or to imprisonment for a term not exceeding six months, or to both fine and imprisonment.

THE ENTOMOLOGICAL BRANCH

THE WESTERN CEDAR BORER, *Trachykele* sp.*

BY R. N. CHRYSTAL, FIELD OFFICER FOR FOREST INSECTS, ENTOMOLOGICAL BRANCH, DEPARTMENT OF AGRICULTURE, OTTAWA.

AT the meeting of the British Columbia Forest Club on the 9th of May, 1915, Mr. Aird Flavelle of the Thurston-Flavelle Lumber Company, in the course of a paper upon the British Columbia Red Cedar, referred to the frequent occurrence of a "powder worm" boring extensively in the sapwood and heartwood of both green and dead timber; and requested at the same time that the matter be taken up with the Dominion Entomological Branch. This was followed by a direct request to the Entomological Branch, made by the British Columbia Forest Branch, as a result of which an investigation was commenced in the Fall of 1915 and continued throughout the season of 1916. The following account has been written with a view to bringing together in a concise form the results of the studies made in this problem up to date.

DISTRIBUTION

We have seen the work of this borer in the following localities on or near the coast:--Stave Lake, North Vancouver, Howe Sound, Sechelt Inlet, Pender Harbour, Nelson Island Gordon Pasha Lakes, and Powell Lake; in addition its presence has been reported to us from Malaspina Inlet. Lund and Harrison Lakes; in short the distribution is fairly general.

*This species is very closely allied to and perhaps identical with *opulenta* Fall; although the work of the larva is exactly of the type figured for *blondeli* Mars. by Burke in the U. S. Yearbook of the Dept. of Agric. for 1909, pp. 410 and 411 and not at all like that figured by him there for *opulenta*.

One correspondent remarks, however, that in his estimation the region on the western side of Puget Sound is infested much more heavily than any locality on the British Columbia coast. Mr. Aird Flavelle also states that so far as his experience goes, they have never found any worms in the timber from north of Seymour and Euclataw Rapids.

The worm found boring in the cedar is the larva or grub of a beetle belonging to the *Buprestidae*, a family of wood borers, and to the Genus *Trachykele*, a Genus rare in our Canadian collections, and about whose life history and habits little has been known.



FIG. 1
ADULT BEETLE,
Trachykele
(Original.)

The adult is a beautiful, shining, golden-green beetle one half to three quarters of an inch in length, and slightly less than one quarter of an inch in breadth; the body is elongate-oval in shape, tapering markedly towards the hinder end. The shining velvety green of the upper surface is without any marked spots or lines of another colour; the whole surface is densely punctured and the wing covers are marked with faint raised lines and deep depressions. The under surface, also entirely green, is more shining and smoother in appearance owing to the finer punctu-

ation; and it is covered with a fine grey pubescence.

THE LARVA

The larva is about one and a quarter inches in length, and cream coloured with the exception of the mouth parts which are dark brown to black. The small and more or less retracted head is followed by three broad, flat segments comprising the thorax which in turn are followed by the ten sub-cylindrical and narrower abdominal segments, the whole body tapering gradually towards the hinder end with the last segment decidedly narrower than the preceding ones.



FIG II. LARVA OF
Trachykele
Dorsal Surface
(Original.)



FIG II. LARVA OF
Trachykele
Ventral Surface
(Original.)

LIFE HISTORY

So far, despite extensive investigations in the field, little information has been collected by us regarding the period of emergence and flight habits of this species. Two specimens of the beetle are in our collection, one taken on May 22nd, 1915, at Lillouet, B.C., by Mr. E. M. Anderson, lately of the Provincial Museum of Natural History, Victoria B.C., and the other taken by Mr. J. M. Swaine, dead in its pupal cell just below the wood surface of a cedar branch, on September 12th, 1915. It is probable, however, that the adults emerge early in the spring.

It is known also that in at least some cases the eggs are laid on the

branches. Small larvae have been found working downwards in branches of less than four inches in diameter, their narrow tunnels having been followed back to a point where they could not be traced with certainty. In one tree which was felled specially for examination, the larvae were working extensively in a side branch of less than ten inches diameter; and had commenced their life in that branch, as no tunnels were found leading either into or out of the main stem.

The tunnels of the borer are very irregular, in cross section, they are oval in shape and about one half by one quarter of an inch in diameter; very often, however the grub feeds irregularly on both sides of the tunnel making a wide excavation for a long distance, the tunnel narrowing down again gradually to its normal width. The tunnels are closely packed with the wood shavings and excrement of the larva. This refuse when fresh is quite white in colour but gradually darkens with the surrounding wood, until it is often difficult to distinguish the "worm holes" in cross

sections of the log.

In the main stem the tunnels are found running chiefly in the heart-wood, sometimes they penetrate to within a few inches of the heart of the tree. No definite data have as yet been collected on the length of the tunnels, their winding nature rendering this fact difficult to ascertain.

PUPAL CELL

The pupal cells in most cases examined were found in the branches; a few were located in the main stem just below or above a branch. The exit holes are oval in outline and are often plainly visible at a little distance.

DAMAGE

Mr. H. E. Burke, of the U.S. Bureau of Entomology, in a paper on "Injuries to Forest Trees by Flat Headed Borers," discusses briefly several species of *Trachykele*, *T. opulenta* Fall, from California which attacks the famous big trees *Sequoia gigantea*, and several species of cedar; and *T. blondeli* Mars from Western Oregon and Washington.

In connection with *T. opulenta* he

report of the Supervisor of a Washington forest to the effect that a large part of the cedar in his district was worm eaten, and that the worm-eaten trees were often green and apparently thrifty when the timber was so full of holes as to be of little value.

Our investigations in British Columbia, so far as they have gone, have shown a similar condition of

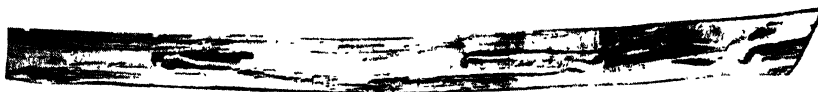


FIG. III. LARVA OF *TRACHYKELE* IN SITU, IN A SMALL GREEN BRANCH OF CEDAR, NOT MORE THAN ONE AND A QUARTER INCHES IN DIAMETER (Original).

mentions having found one young tree twelve inches in diameter in the famous Mariposa Grove, which had most of its wood completely riddled by successive broods of larvae, and apparently killed by this species. *T. blondeli* he reports as seriously injuring the timber of many of the finest standing trees of the western red cedar in Western Oregon and Washington; in connection with which statement he quotes the

things so far as the outward appearance of the affected trees is concerned. We have found cedar trees which looked perfectly sound and healthy to the topmost branch, to be so badly riddled that the wood from a point about sixteen feet from the ground was useless for any practical purpose. In contrast to this we have found larvae working in dead dry branches which had no bark on them.

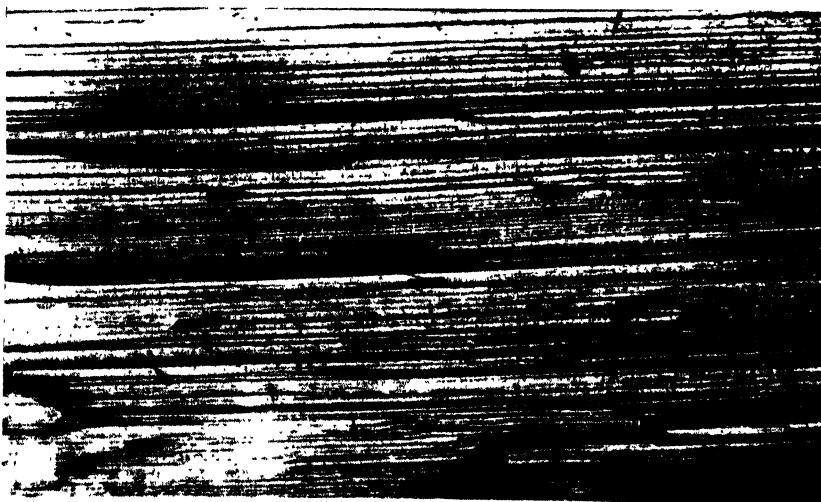


FIG. IV. SHINGLE BOLT SHOWING SEVERE INJURY BY THE LARVAE OF *TRACHYKELE*, NELSON ISLAND, B.C. (Original).

In regions where the borer has been found to be prevalent we have searched in vain for any explanation of the variations in severity which occur in cases of infestations lying contiguous to one another; in some places examined, however, we were inclined to believe that the cedar growing in low lying damp areas was more susceptible to attack than that growing at a higher elevation.

Only once in our investigations in British Columbia have we found this borer working in a young tree. The fact that sometimes old tunnels are found in butt logs of mature trees may possibly be accounted for in this way; the borers having worked in this portion of the tree when it was younger. It has been suggested that in such cases the entrance may have been through an old fire scar, but so far we have no evidence that this is the case.

So far as the injuries to the timber are concerned, generally speaking the upper parts of the tree are the more seriously affected. In this connection we have endeavoured to obtain first hand information of a practical nature, and among others we consulted Mr. Aird Flavelle who was kind enough to supply us with data on the condition of the cedar cut recently in an infested section of the country.

In one or two of the booms from this limit nearly 50 per cent of the logs which went through the mill were estimated to be more or less affected; the later booms which consisted of logs cut at a higher elevation reduced the percentage of infestation to about 20-30 per cent of the total from the whole claim.

Mr. Flavelle further informs us that the depreciation in value occurs through the reduction in the grade of the lumber; for instance instead of getting No. 1 and 2 clear lumber out of logs which are affected, it reduces the grade of the lumber produced to No. 2 common, which barely pays the cost of manufacture and allows nothing for log value, as

in normal times. No. 2 common realizes from \$6.00 to \$8.00 per thousand at the mill, whereas \$30 per thousand is a fair average price for No. 1 and 2 clear lumber.

For shingles a badly affected log is totally ruined so that the loss in timber is even greater in a shingle mill than in the sawmill. A few of the small rough top logs were sorted out and sent down to a small mill to be cut into 8x8 for railroad purposes. Quite a number of these were 'culled' owing to the excessive number of worm holes in them.

Mr. Flavelle estimates that on an average the logs from this limit were depreciated 30 per cent in value, which would make a total depreciation on the log value of this timber from 6 to 10 per cent, or say from 75c to \$1.25 per thousand.

A brown stain was observed surrounding the tunnels in many cases, Mr. Flavelle states. It extended for half an inch to one inch on either side of the hole, this stain seemed to accompany the borings in every case, the two often following the course of an annual ring for a considerable distance; in a freshly cut log at a distance of 3 to 4 inches in from the sapwood a distinct brown ring was visible, marking the affected part of the log very clearly.

From what has been already stated, it will be seen that in this problem we are face to face with conditions which render any systematic scheme of control a matter of difficulty. One principle may, however, be laid down, and this applies to the control of wood boring species in general; namely, that whenever possible slash burning should be undertaken as a part of all lumbering operations. Particularly is slash burning important in the case of the species here dealt with, the larvae of which may be found in numbers in the branches and tops of trees, and its value as a general measure of prevention of forest insect injuries by bark and wood borers has already been discussed in other papers.

THE HEALTH OF ANIMALS BRANCH

EXPORT REGULATION OF CANADIAN SHEEP

THE United States Department of Agriculture has issued a new regulation governing the importation of sheep from Canada which does away with the necessity for dipping under official supervision prior to shipment. Following are the new regulations which are designated "Amendment No. 7, Bureau of Animal Industry, Order No. 209":

"All sheep imported into the United States from Canada for breeding, grazing or feeding must be inspected at the port of entry by an inspector of the Bureau of Animal Industry. They must also have been inspected by a veterinarian in the employ of and receiving a salary from the Canadian Government, and be accompanied by a certificate signed by him stating that he has inspected the sheep and found them free from disease, and that no contagious disease affecting sheep has existed in the district in which the animals have been kept for 60 days preceding the date of importation. The owner or importer shall present an affidavit that said certificate refers to the sheep in question. Any such sheep which are unaccompanied by the

aforesaid certificate shall be subjected to a quarantine of 15 days."

The regulations requiring the dipping of sheep to be exported from Canada to the United States came into effect in August, 1905, when dipping twice was required, under the supervision of a Canadian official veterinarian, of sheep from districts infected with scab. In April, 1911, all sheep imported into the United States from Canada were required to be twice dipped under the supervision of an official veterinarian of Canada. These regulations remained in force until the recent order, which became effective on July 1st this year. This latest amending order is a tribute to the healthfulness of Canadian sheep and their freedom from sheep scab, the extermination of which on Canadian soil has been the constant effort of the Health of Animals Branch.

DOURINE AND ITS CONTROL

BY W. L. HAWKE, D.V.S., INSPECTOR IN CHARGE, VETERINARY RESEARCH LABORATORY, LETHBRIDGE, ALTA.

DOURINE is an important disease of horses, mules and donkeys, caused by a species of animal parasite or germ known as the *Trypanosoma Equiperdum* and is peculiar in that it is contracted or spread only by breeding. That is to say, the germs of the disease gain entrance to the body of a healthy animal, by a diseased stallion covering a healthy mare or a healthy stallion covering a diseased mare.

Dourine is known to have existed in Europe for many years and was probably introduced into America

in 1882 in an imported Percheron stallion brought to Illinois. From this centre it gradually spread. Its presence first being suspected in Canada in horses in the Lethbridge district in the year 1904.

The disease, while comparatively a new one in this country, is particularly important because of the fact that since its introduction, it has more than once seriously threatened the horse-breeding industry of Western Canada, more especially that of the Province of Alberta.

In the horse, dourine infection,

more often follows a chronic course. While, it may develop and result in the death of the animal, if left to run its course, in a few months' time. In these latter cases usually sufficient evidence of the existence of a serious disease are presented, which lead to an investigation and its true nature detected. Unfortunately, as stated above, the greater percentage of infections follow a chronic course, which may extend over a period of two, three and more years. During this time no signs of disease may be observed, or if present may be so mild that they do not lead one to suspect a disease of a serious nature. Especially is this so in range horses which are, as a rule, not under close observation. During this long period the infected animal to all appearances, may appear in normal health, showing no signs of disease, at the same time quite capable of transmitting the disease by breeding contact with a healthy animal. These are termed immune carriers.

At any time during the chronic course of the infection, the disease may develop and cause a rapid breakdown in the animal, especially so when the animal is subjected to extreme conditions such as a spell of hard severe work which a farm horse often experiences in a busy season, or as a range horse in extremely cold weather, in the winter months together with poor pasture and lack of water. Conditions such as tend to lower the vitality of the animal.

METHODS EMPLOYED IN CONTROL

Dourine is one of the diseases dealt with and controlled by the Health of Animals Branch of the Department of Agriculture. All premises on which the disease exists or is suspected to exist are placed under quarantine by officers of the Department. The breeding of horses thereon is strictly prohibited and their movement controlled until such time as the disease no longer exists on the premises, when the quarantine is

lifted. All animals found to be diseased are destroyed (there being no successful treatment known) and a liberal compensation paid to the owner.

When dourine was first suspected in the country great difficulty was experienced in its control owing to the fact that it had spread to a considerable extent among the range horses. There being no means of detecting diseased animals other than by symptoms which might develop, required that the suspected herds be held under quarantine restrictions for lengthy periods and frequently examined by officers of the Department in order to detect and destroy the diseased. This caused considerable loss to the owner through not being able to breed, occasioning the loss of one, two or more colt crops, as well as endless work for officers of the Department in examining the range horses, which at best was hard and difficult work. Again difficult to control the suspected herds, where, under range conditions different herds intermingled to a greater or less extent. Then when a herd was released from quarantine, after a reasonable time having elapsed without having detected any further evidence of disease, it is quite possible that one or more of the so-called immune carriers remained, which it was impossible to detect, and which if present would prove a source from which disease could spread at a later date.

However after persistent work by the Department, the officers of which are deserving of the greatest credit, the disease to all appearances was brought under control and hopes appeared that it would soon be cleaned from the country. These hopes later proved false as the disease was apparently smouldering all the while, and in the fall of 1913 the most extensive outbreak yet experienced was discovered among the larger herds of Southern Alberta.

Soon after dourine was first suspected in the country a quarantine

station was established near Lethbridge, Alta., for the purpose of keeping under observation suspected cases of the disease and so far as possible to study its true nature.

In February, 1907, after exhaustive study and research work the animal parasite causing dourine was detected in, and isolated from, a naturally infected mare by Dr. Sullivan and Dr. E. A. Watson, the latter of whom was in charge of this station. While the disease existed and was dealt with as dourine for a number of years previously, both in Canada and the States, this was the first time the parasite was demonstrated in America, settling beyond all doubt the true nature of the disease. Since this discovery and after a number of years further work Dr. Watson has been able to establish a laboratory method or test, by which the disease can be detected in the blood of an infected animal. The advantages and value of this test can not be over estimated and fortunately it was possible to employ it in dealing with the extensive outbreak of 1913, above-mentioned, and its accuracy having been proved beyond all question, it has been adopted by the Department as the official test for dourine in Canada.

Therefore the methods of dealing with and controlling dourine, since its introduction to Canada have made great progress. While at one time the most difficult disease to detect and control, at the present time it is most simple.

Under the present methods of control, all suspected animals are placed under quarantine by officers of the Department, and, as well, all possible contacts, which are looked upon with suspicion, traced. A sample of blood is taken from each breeding animal and forwarded to the laboratory to be tested, a laboratory having been esta-

blished at the quarantine station for the purpose. Here horses affected with dourine as well as known healthy horses are kept, blood from which is used to control the testing of all suspected samples received. Any animal whose sample on being tested proves to be diseased is at once destroyed. In this way it is possible, in a very short time to detect and destroy all diseased animals in a herd, thus avoiding lengthy quarantines and its accompanying inconvenience and loss to the owner through being unable to breed. With the larger herds it is often necessary that they be tested more than once, because of the fact that it is difficult to say whether or not all animals have been gathered and tested; at the same time it is difficult to absolutely control breeding operations because of the possibility of young stallions being at large on the range. With these herds the procedure followed is to test the animals repeatedly until no diseased ones are found.

All stallions in the infected districts, so far as possible, are tested each year, so that should one become diseased, it is detected, contact animals traced and dealt with before the possibility of its having spread to any extent. As well; all breeding animals shipped from these districts are inspected by officers of the Department and any suspicious animal held until tested.

In dealing with dourine along the present lines followed by the Department, the confidence and co-operation of the horse owners has been gained, who, with few exceptions, do all in their power to assist the officers in its detection and control.

The good results obtained can be noted in the following table showing the number of animals tested each year and the gradual decrease in the percentage found to be diseased and necessarily destroyed:

Year	No. Tested	Diseased cases reacting to test and destroyed	Percentage diseased
1914.	4015	512	12 7 ⁶ / ₁₀₀
1915	6714	417	6 2 ⁶ / ₁₀₀
1916	14114	217	1 5 ⁶ / ₁₀₀
1917 (to date)	4588	17	0 37 ⁶ / ₁₀₀

While dourine, at the present time, is well under effective control, it still exists to a more or less extent; but, with the continued co-operation of the horse owners, who can materially assist by reporting to the nearest veterinary officer any irregularities or suspicious signs of disease which may occur in his breeding ani-

mals, more particularly stallions used for stud purposes, which conditions will be investigated without expense to the owner, and by the present methods employed by the Department, it will be quite possible, in the course of a few years' time, to entirely rid the country of this disease.

THE SEED BRANCH

THE SEED PURCHASING COMMISSION

BY GEO. H. CLARK, B.S.A., SEED COMMISSIONER

THE rapid increase in areas under cereal crop in the Prairie Provinces has not been followed with an equivalent development of business organizations of capacity sufficient to meet the full requirements of good seed grain in years of partial crop failure covering considerable areas. The Immigration Branch of the Department of Interior has for many years provided seed grain to homesteaders on the basis of deferred payments, and on occasions have extended that distribution to all farmers who have been in need.

The condition of the wheat crop in southern Manitoba and south-eastern Saskatchewan, which had been severely attacked by rust during the summer of 1916, made it clear as early as the first of September that large quantities of seed wheat would have to be shipped into that area from the Province of Alberta, and a month later the Seed Purchasing Commission of the Seed Branch was established and at work in each of the three Prairie Provinces. The new plan for handling this difficult seed situation was authorized by the Honourable Arthur Meighen, then

acting Minister of Agriculture, based on the recommendations of the Seed Commissioner. This arrangement provided that all farmers who were in need of financial support to procure their supplies of seed grain, should establish their claim to such support before the local governing body in the municipality where they lived, which governing body would be expected to assume the responsibility of financing their purchases, either directly or with the co-operation of their provincial governments.

The Seed Purchasing Commission, with headquarters at Regina, Sask., proceeded in early October with the purchase of seed wheat, for which they were authorized to pay a premium over current market prices amounting to not more than five cents per bushel. All of the seed purchased by the Commission was subject to inspection on delivery at the Canadian Government interior terminal elevators at Saskatoon, Moose Jaw, or Calgary, in which all of the seed purchased was stored and cleaned for shipment. Standards of quality for seed wheat, seed oats and seed barley were fixed by order in council and administered by the

Seed Inspection Division of the Seed Branch staff, which had two experienced inspectors at each elevator. All of the seed grain purchased was bought subject to being graded seed by these men, over whom the Seed Purchasing Commission had no direct control. In addition to inspecting the seed grain purchased by the Seed Purchasing Commission, these seed inspectors issued certificates and caused to be separately binned all grain admitted to these elevators that was sufficiently clean and good to pass the seed grades. The Seed Purchasing Commission did not have a monopoly of the purchase and sale of grain for which seed certificates were issued at these interior terminal elevators. The Commission did, however, handle a sufficient quantity of seed grain to ensure an abundant supply at fair prices.

The Commission purchased six hundred and twenty-nine thousand bushels of seed wheat, four hundred and eight thousand bushels of seed oats, and a small quantity of seed barley. This seed, which was selected because of being clean and free from wild oats and other noxious impurities, was carefully re-cleaned and sold at a price sufficient to cover the net cost of the re-cleaned seed. Special freight rates and arrangements for handling were provided by the railway companies. The provincial Departments of Agriculture for Manitoba and Saskatchewan extended their hearty co-operation by providing the municipal governing bodies with financial assistance to enable them to purchase seed for needy farmers. Seed grain in any quantity was shipped either in sacks or in bulk to fill orders received from individual farmers, farmers' organizations, municipal governing bodies, or seed merchants, in any part of Canada. One hundred and fifty-four thousand bushels of seed oats and a small quantity of seed wheat were shipped on orders from points in Ontario, Quebec, and New Brunswick.

All orders were filled subject to cash payment by bank draft, and the moneys as collected were deposited to the credit of the Receiver General. A total of one million, four hundred thousand dollars was placed to the joint credit of the Chief Commissioner and the Accountant in Regina in installments of one hundred thousand dollars as required. The total amount returned to the Receiver General up to the 31st of September, 1917, was one million, four hundred and twenty-two thousand dollars, in addition to which there is in the Canadian Government elevator at Moose Jaw about twenty-four thousand bushels of seed oats, which were held in reserve and will be needed in Saskatchewan for next spring's seeding.

The volume of work entailed in handling seed grain of this amount, which has to be procured by picking out special cars of superior quality can be fully appreciated only by men who have had wide experience in this kind of business. All of this work, however, was managed throughout by the members of the Seed Branch staff who served on the Commission and who had had several years' experience in the work of seed inspection. That the seed sold and distributed was generally satisfactory would seem evident from the fact that no serious complaints and many letters of commendation have been received.

The Commission is now purchasing seed oats in quantity for next year's supplies to meet the needs of northern areas in Saskatchewan, Manitoba, Ontario, Quebec and New Brunswick. In addition they will procure sufficient supplies of high quality Marquis seed wheat, grown from registered seed, to meet the needs of those farmers who may desire to procure a supply of fresh seed of superior quality. All orders for seed grain desired from this Commission should be addressed to Seed Purchasing Commission, Post Office Building, Regina, Sask.

THE LIVE STOCK BRANCH

A BACON PRODUCTION CAMPAIGN

FOLLOWING instructions from the Honourable T. A. Crerar, Minister of Agriculture, a meeting was called by the Acting Live Stock Commissioner, Mr. H. S. Arkell, in Ottawa, on October 26th, of representatives of the Departments of Agriculture in the provinces of Ontario, Quebec, New Brunswick, Nova Scotia and Prince Edward Island, and of delegates from the different swine-breeding associations, for the launching of a Bacon Production Campaign. The Food Controller, Hon W. . Hanna, and the principal members of his staff, attended and furnished much information regarding the situation.

After the opening address of Mr. Arkell, who presided, Mr. Hanna made an impressive speech pointing out the serious state of the world's affairs, particularly so far as regards hog products. He referred to representations that had been received from France and other belligerent nations relating to the urgency of their needs and said that it was known that the swine-herds of Europe had been decreased since the war commenced by 32,425,000 head. Even if the Allies were to kill the greater proportion of their hogs they could not meet their own demands. Even in the United States the production could not be much more than would meet the requirements of the home market. As long as the war lasts the decrease in Europe must continue to develop. Thus a profitable market for all Canada can produce is assured for years after the war. The matter had been taken up with the Hon. T. A. Crerar, Minister of Agriculture, and he had given the movement for the greater production of swine his hearty endorsement and had put the Live Stock Branch of his Department at the service of the work. The meeting was held to enlist all the forces

of the Dominion in the same direction.

Lengthy discussion followed Mr. Hanna's remarks, a deal of valuable information and counsel being given and the following resolutions adopted:

Moved by Mr. J. E. Brethour, seconded by Professor G. E. Day:

That this meeting having the assurance of the Minister of Agriculture and the Food Controller that they will regulate the spread between the producer and the consumer, we, the representatives of the Hog-Breeding Industry, approve of the movement to increase hog production and proceed to consider ways and means.

Moved by Mr. J. E. Brethour, seconded by Mr. E. S. Archibald:

That the Department of Agriculture, acting in co-operation with the Food Controller's Department be requested to make the best arrangements possible to make available to farmers and feeders of live stock all available wheat screenings of high grade, and also make the necessary arrangements to properly control the manufacture and sale of bran, shorts and middlings, and prohibit the use of weed seeds and other injurious material as adulterants in the manufacture of the same.

Moved by Mr. M. Cummings, (Secretary for Agriculture, Nova Scotia), seconded by Mr. J. E. Brethour:

That the Live Stock Division be asked to prepare a brief *resumé* of the facts presented at this meeting and the deliberations with a view to presenting before the farmers as soon as possible the actual situation and so to stimulate them into hog production, and that after this is prepared, it be circulated in a somewhat similar way to that in which the bulletins of the Department are circulated.

Committees on different branches of the work needed were appointed who at once entered upon consideration of the details.

Following the foregoing recorded gathering of representatives from the eastern provinces to consider the question of increased production of swine products, a meeting of similar representatives from the western provinces, was arranged to be held also in Ottawa, on November 7th.

PART II

Provincial Departments of Agriculture

FARM LOANS AND LAND SETTLEMENT

NOVA SCOTIA

BY ARTHUR S. BARNSTEAD, SECRETARY OF INDUSTRIES AND IMMIGRATION

THE Land Settlement Act of Nova Scotia says that whenever a loan company will agree, upon receiving the guarantee mentioned, to advance to a farmer on mortgage on farm lands and buildings an amount not exceeding 80 per cent of the value of such farm lands and buildings, then the Lieutenant-Governor-in-council may give a guarantee in writing, to such loan company against loss on any such mortgage taken to an amount not

exceeding the difference between 40 per cent of such appraised value and the amount of the loan.

Under this Act there has been 155 applications for loans. Of these applications 57 have been accepted. The amount of loans applied for totals \$279,735. The amount of loans granted totals \$112,305.

The funds granted are utilized largely in purchasing stock and implements, and in some cases in the purchase of farm properties.

NEW BRUNSWICK

BY W. R. REEK, B.S.A., SECRETARY FOR AGRICULTURE

NEW Brunswick, in common with the other Maritime provinces, has seen her rural communities gradually depleted by the inducements offered in large cities or the newer parts of the great West, and as a result many homesteads gradually become over-run with weeds, the buildings racked and desolation in possession where once a family existed, with plenty, though perhaps not in great wealth. She has also seen many who have remained grow wealthier, with a result that the farms are in excellent condition, the farmer satisfied and a demand from many without money, but who were willing to work for a

chance to make their homes in New Brunswick because they, too, had faith in the latent possibilities which were awaiting development.

Capital was required. The Government in 1912 passed "An Act to Encourage the Settlement of Farm Lands." Under this a "Farm Settlement Board" was constituted, consisting of three members, a body politic and corporate. They have the power to purchase, hold and possess, within the province, real estate suitable for general farming purposes, to improve and erect houses and buildings where necessary. They may also buy and sell personal property in connection with real

estate being bought and sold.

Farms are purchased and sold to settlers at cost. If the purchase price is less than \$1000 the initial payment is to be 25% of the purchase price, but if more than \$1000 then an initial payment of 35% is demanded. The balance with interest at 5% is to be paid at a time not exceeding ten years from the date of the agreement. Under special cases an extension of two years may be granted.

Approximately 332 farms have been purchased and with a few exceptions these have been sold. Many were taken by residents of the pro-

vince and several by men coming from other parts. The deeds are held by the Board until all payments are settled. The initial payment is small and terms are sufficiently easy in order to allow young men of character to obtain a start, thus helping them in the province, whereas they would have otherwise left and many would have drifted out of Canada.

It is true that it does not meet every condition which might be met under a system of Rural Credits, but it alleviates the difficulties facing many, and in conjunction with such a system provides for every worthy applicant.

QUEBEC

BY J. ANTONIO GRENIER, DEPUTY MINISTER OF AGRICULTURE

THERE is no system of agricultural credit in the province of Quebec, at least no system such as has been established under special laws in other provinces.

There is, however, in our statutes a law under which farmers may establish co-operative banks or rural institutions of credit (*caisses rurales*). This is the Law of the Quebec syndicates. These "caisses," founded by Mr. Alphonse Desjardins, under the patronage of the late Earl Grey, then Governor-general of Canada, who was one of the shareholders of the "Caisse populaire de Lévis," have greatly increased in number in this province and some of them are very helpful to farmers and workingmen.

These banks, however, only dis-

pose of the funds that are entrusted to them by their members. No money is loaned by the Government. It is not, therefore, agricultural credit, properly speaking.

The Minister of Agriculture is not authorized by law to lend money directly to farmers. He may, however, make loans to agricultural associations, farmers' clubs, co-operative associations, breeding syndicates or other agricultural associations for the purchase of registered breeding animals or any other purpose in connection with the improvement of agriculture. Such authorization was given to him by the Legislature in 1910 under 1 Geo V., ch. 13. The following amounts have been loaned to our various associations during the last three years:—

	1914-15	1915-16	1916-17
Agricultural associations . . .	\$ 2,736 00	\$ 8,752 00	\$ 7,249 00
Farmers' Clubs . . .	9,911 70	12,366 44	16,741 37
Breeding syndicates . . .	9,900 00		
Various associations . . .	19,788 24	22,942 00	18,773 00
Totals	\$42,335 94	\$44,060.44	\$42,763.37

All these moneys were loaned without interest and are repaid by means of annual instalments. Almost the whole of the amount was spent on the purchase of breeding

animals. Some fifty clover threshers were purchased out of this money in the last two or three years by various farmers' clubs and agricultural associations.

NOTE.—The co-operative banks (Caisses Rurales) referred to by Mr. Grenier were described in THE AGRICULTURAL GAZETTE for May 1914. As was pointed out their operations are not confined to rural districts, but have been established as well in labouring district of urban centres; mining districts and in newly settled sections. The Statistical Year Book of Quebec for 1916 shows the amount of business transacted by all of these banks from their organization up to the end of 1915. Reports from three of the smaller banks were not available. The amount of business done is shown in the following tables:

RECEIPTS

Capital Stock	\$ 932,134.06
Savings	9,235,201.12
Remitted on loans	5,207,284.11
Levied on receipts and profits	353,304.26
Total	\$15,727,923.55

PAYMENTS

Capital withdrawn	\$ 209,081.97
Savings withdrawn	8,089,107.58
Loans	6,905,414.16
Interest on savings	63,551.40
Dividends	88,562.26
General expenses	45,753.31
In hand	326,452.87
Total	\$15,727,923.55

SASKATCHEWAN

BY F. H. AULD, DEPUTY MINISTER OF AGRICULTURE

SASKATCHEWAN'S Farm Loans Act became law on May 1, 1917, but in view of the approach of the provincial elections the Government announced that no applications for loans could be accepted until the elections had been held. The election date was June 26th. Since that date the Farm Loan Board has been open for business and the farmers of Saskatchewan have apparently been mindful of the fact for during July and August they applied for loans to the number of 1,124 and to the value of \$2,259,015.

The Saskatchewan Farm Loans Act is a clear cut business statute and specifies the uses to which loans may be put,—namely, permanent improvements, productive purposes, the payment of liabilities previously incurred for such purposes, or in special cases the purchase of land. Live stock is not specially referred to in the Act, but several borrowers are seeking money to enable them to buy cattle. The Saskatchewan Live Stock Purchase and Sale Act under which a third of a million dollars' worth of stock has been sold to Saskatchewan farmers on credit terms makes special provision for

granting credit in the form of cattle, sheep and swine.

All loans under the Farm Loans Act are to be for 30 years and are to be made at cost. Repayment will be on the amortization plan so that the borrower has the same amount to pay each year. He may pay more than the sum due, but the usual amount will be due the following year, any excess being applied to the final payments. It is expected that the annual payments covering both principal and interest will be less than most borrowers in Saskatchewan are now paying in interest alone.

A PROVINCIAL LOAN

For the purpose of meeting the financial requirements of the Act, the Provincial Government has decided upon offering a bond issue to the people of the province to be known as the Saskatchewan Greater Production Loan. The bonds are to be issued in denominations of \$20, \$100, \$500 and \$1000, bearing interest at 5 per cent per annum, payable half yearly, and to be redeemable at par at any time on giving three months' notice to the Provincial Treasurer

BRITISH COLUMBIA

BY MAXWELL SMITH, CHAIRMAN, LAND SETTLEMENT BOARD

THE Land Settlement and Development Act, passed at the last session of the Legislature, was designed with the object of benefiting every citizen of the province by facilitating increased agricultural production.

The administration of the Act is entrusted to what is known as the Land Settlement Board consisting of the chairman and five directors.

While the loaning of money to farmers for development purposes, chiefly to increase production, will continue to be an important feature of the Board's work, the public development and settlement operations, provided for in the Act, will doubtless be the most far-reaching from a financial and educational point of view, as there are many areas of unoccupied fertile lands within the province where the Board may undertake extensive clearing, draining, dyking, irrigation and reclamation schemes, thereby helping solve many of the difficulties with which the farmer is confronted.

It should be borne in mind that the Board is not entering the competitive, but rather the co-operative field, as it is the intention that both the loaning and development features of the Board's work shall be made self-sustaining and conducted on sound business principles.

We realize that our first duty is to create conditions that will facilitate the profitable occupation of the land, making it possible for the farmer to earn a fair living under congenial circumstances. Then there will be no need to worry about getting people to occupy and cultivate the soil.

In "The Land Settlement and Development Act" a good start has been made along practical lines, as the Board is empowered to undertake important land development work

that should revolutionize the agricultural status of the province.

The establishment of demonstration areas in different parts of the province, having a diversity of climate and soil conditions, will not only facilitate rapid and permanent settlement on these areas, but all the information thereby obtained, as to the best and most economical methods of clearing, dyking, draining, irrigation, cultivation, etc., with accurate figures as to cost and possibilities of revenue, will be available for the benefit of private enterprise.

We should not be satisfied with the agricultural conditions of British Columbia until she is producing her own consumption of necessary food-stuffs and has begun to export a sufficient surplus of what we can grow ourselves to purchase the luxuries we are compelled to import from other countries.

While more or less paternal, the Land Settlement Board is not a benevolent institution. Its operations must be conducted on sound business principles. It is proposed to make the demonstration development schemes sufficiently revenue-producing to re-imburse the Government for the expenditure, while at the same time facilitating settlement under reasonable advantageous conditions.

The loaning department must also be conducted on a self-sustaining basis. Loans are made on first mortgage securities for agricultural purposes. It must not be overlooked that there are difficulties confronting the Board in these abnormal times, in regard to the question of obtaining the necessary funds with which to operate during the present unsettled state of the money market.

QUEBEC

AGRICULTURAL WORK AT THE QUEBEC MILITARY HOSPITAL

BY A. DESILETS, B.S.A. DISTRICT REPRESENTATIVE

WITH the authorization of Mr. J. H. Sexton, Vacation Officer, Major J. D. Pagé, chief of the Military Convalescent Home of Sans-Bruit, Quebec, has made arrangement for teaching agriculture to convalescent soldiers. The courses are in charge of the writer. The programme includes the following:—

(a) Drainage survey and rotations—practical work on the hospital farm. Five acres were drained by the farmer and soldiers under the direction of the instructor in the fall of 1916.

(b) Lessons in commercial poultry keeping.—Selection of Rhode Island and Wyandotte stock, artificial incubation, feeding, grading of eggs, castration, fattening and slaughtering, all these are practised under the supervision of the instructor. Several soldiers have made a start in poultry keeping since leaving the home.

(c) Market gardening, prepared by class work, has been conducted on a small area, which will be twice as large next year. Model hotbeds are prepared and sown by the soldiers themselves, who also cultivate a

co-operative garden, with the help of the farmer. In the spring of 1918, the soldiers will grow individual plots, the products of which will be sold for their own profit.

(d) Two bee-hives were placed at the disposal of the class, and the work was done in the presence and with the help of the pupils.

Some of the convalescents also help in field husbandry, the preparation of the soil, ploughing, harvesting, etc., and the care of the lawn and flowers.

In July, the professor and the pupils visited the Cap-Rouge agricultural station, where they saw the herds, the buildings and the experimental plots. Automobiles had been placed at the disposal of the excursionists by Mr. M. T. Ross.

A second visit was paid to the various departments of the provincial fair of Quebec. The pupils were taken by the instructor to the cattle, agricultural implements, horticultural and poultry exhibits. This visit lasted five hours and the students were greatly interested.

THE ROYAL AGRICULTURAL SCHOOLS

THE Royal Agricultural Schools, incorporated by the Legislature of Quebec, are designed to give instruction to the sons of soldiers.

Schools and farms are situated in the township of Howard, county of Argenteuil, province of Quebec.

These are open to sons of soldiers of all nationalities or religions who have taken part in the war.

The property of the schools consists of 3,468 acres, of which 1,718 acres are freehold and 1,750 acres are held under license from the Province of Quebec. There is on the property a large stone sawmill with metal roof, a large residential building to accommodate twenty-five boys, a residence for teachers and a number of cottages for workmen. The school will be opened imme-

diately with twenty-five boys but as this is only a small percentage of the number which should be provided, the directors now appeal to the public for a sum sufficient to provide buildings and equipment for at least one hundred. This will cost about fifty thousand dollars.

The schools have been incorporated and the business will be conducted by a board of directors. A board of governors will have general supervision over the schools. A number of gentlemen have already accepted positions of governors and others will be added from contributors to the funds of the schools.

The directors will be in close touch with the Military Hospitals Commission, the Canadian Patriotic Fund, the Soldiers' Wives League and other associations interested in the welfare of soldiers and their families.

Boys of all nationalities and religions will be accepted. They must be in good health and of good character. No vicious boys will be admitted or retained. The parents of boys will be under no expense for their sons, while these are at the schools. When of sufficient age, the boys will be assisted in making a start for themselves.

HOW TO REGENERATE AGRICULTURE

BY J. H. LAVOIE, CHIEF OF THE HORTICULTURAL DIVISION

AN upsetting of equilibrium between urban and rural populations threatening seriously our economical future, has occurred in this country when industry became the direct antagonist of agriculture, and the only way in which this danger can be prevented is to hasten the development of agriculture.

The chief cause of this decline of agriculture lies in the fact that man constantly seeks to improve his comfort; therefore the equilibrium in favour of agriculture can only be restored when this industry has become sufficiently progressive and remunerative to give agricultural workers a degree of comfort at least equivalent, if not superior, to that which they may find in cities and sufficiently attractive to counterbalance urban attractions.

Was there ever such an opportune time as the present to hasten the development of agriculture, when a shortage of food, felt in the most productive countries, exerts on our agriculture an international action of sufficient strength to free it from its shackles and determine the growth of our economic life?

Was it ever more urgent to stop the rural exodus than at this hour, when our urban populations are so uneasy over the excessive cost of food and bewail the lamentable consequences of the desertion from the land?

For all these reasons, and because it is recognized that agricultural progress is necessarily slow, it is important that our Governments should urgently take the necessary steps to spread agricultural teaching in all its forms.

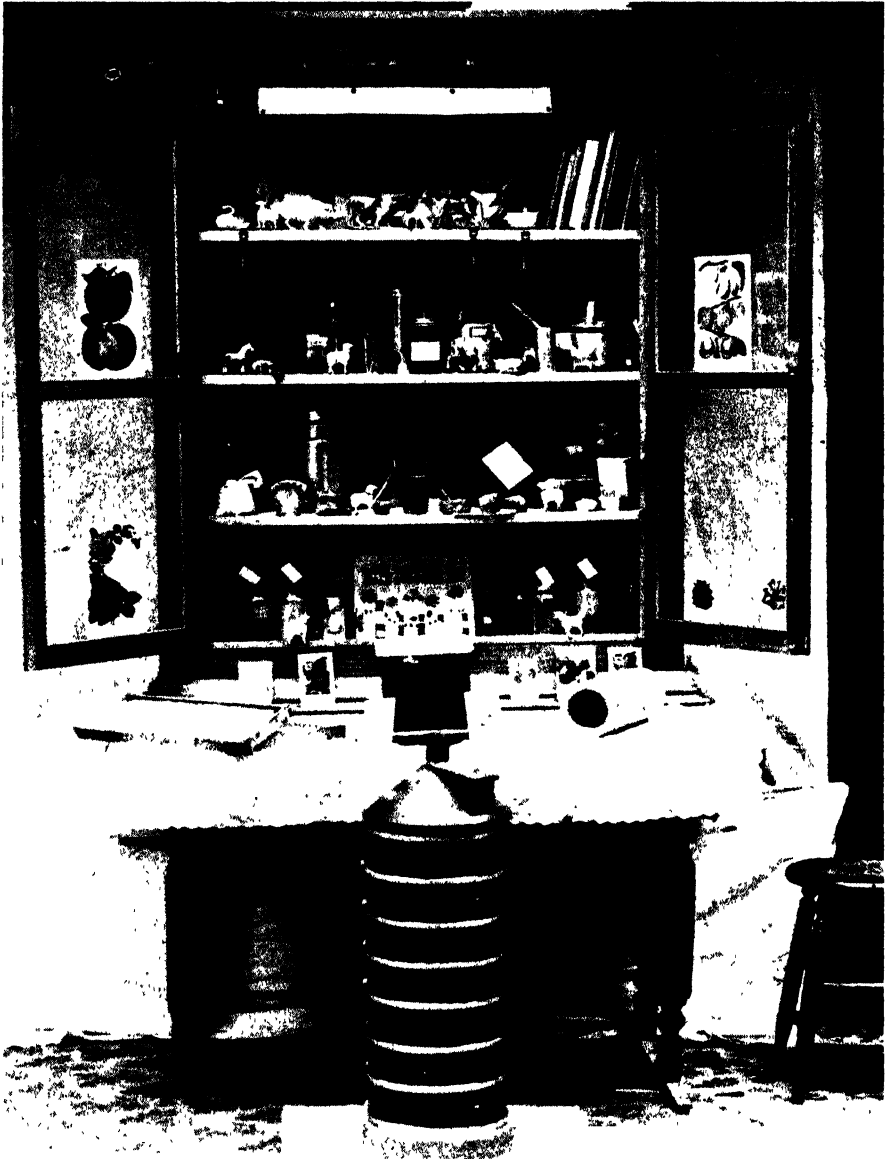
The Quebec Department of Agriculture is not shirking its duty in this respect. Provision will be made for the scientific and technical development of agriculture by teaching the best methods and processes, by all the means at our disposal.

As it is well known, on the one hand, "that any social action must originate with the family" and that, on the other hand, agriculture cannot be made progressive and remunerative unless the farmer has the full cooperation of his children, the department has been endeavouring, for the last few years, to attach the rural youth to the soil by giving it an agricultural training.

To be of lasting effect, this agri-

cultural training should be given in the early youth, hence the reason why the Department has encouraged the creation of school gardens and the

tor of the young women's clubs have often had the opportunity of explaining to the readers of THE AGRICULTURAL GAZETTE the direction



AGRICULTURAL MUSEUM OF SAINT CASIMIR COLLEGE, P.Q.

This school museum includes: a collection of economic plants and grains; samples of soils; sample bottles, test tubes, instruments for practical demonstrations; agricultural miniatures, an egg tester, farm animals in celluloid, a spring scale, explanatory tables, comb and extracted honey, acids, drains, a small hive and a miniature silo, etc., etc.

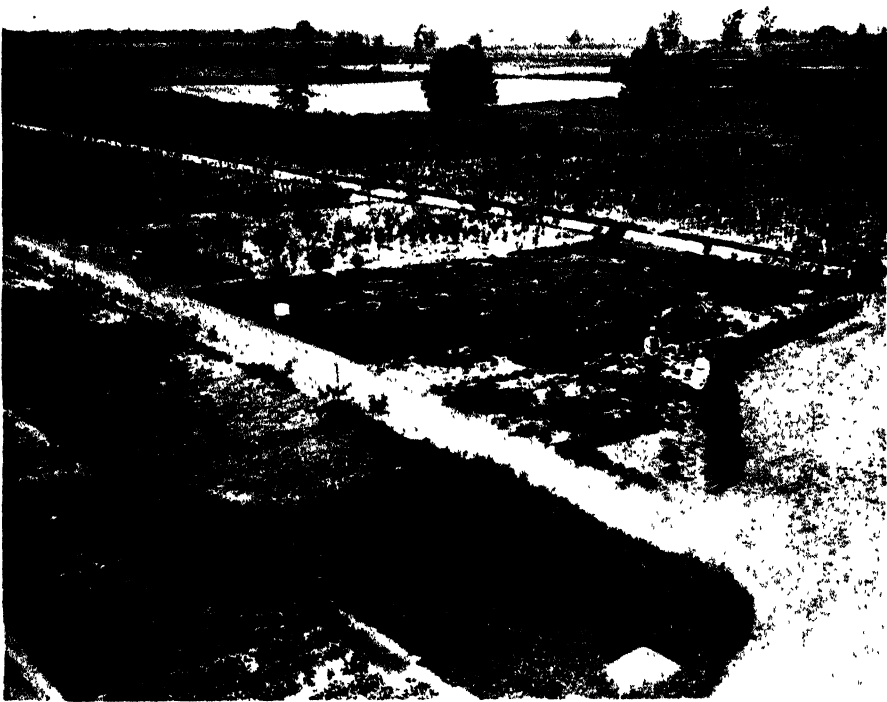
establishment of young women clubs.

Messrs. J. Chs. Magnan, B.S.A., superintendent of the school gardens, and Alphonse Désilets, B.S.A., direc-

given to each of these movements of agricultural regeneration and to supply valuable indications on the results so far obtained.

To complete this information, I shall describe the two chief means by which we are endeavouring to encourage emulation among the children, to stimulate their interest and therefore assure the success of our work. I should mention in the first place the establishment of a provincial nursery, which is to give bonuses to school gardeners during the school fairs; secondly, the teaching of methods for the conservation of fruit.

prizes at the school fairs, held in districts where a District Representative or an instructor resides. The number of trees distributed to each school gardener will vary according to the species and the particular needs of each district. It will not exceed four fruit trees for this year. These trees will be planted around the home, in a place chosen by the instructor during his visit at the home gardens, and in accordance



FRUIT NURSERY OF THE DEPARTMENT OF AGRICULTURE AT BERTHIERVILLE, QUE.

I. NURSERY OF THE QUEBEC DEPARTMENT OF AGRICULTURE

This nursery established at Berthierville in 1914 covers an area of about ten acres, and now contains several thousands fruit trees and shrubs, and ornamental trees and shrubs of acclimatized varieties, a free distribution of which is being made to the children gardeners winning the first, second and third

with the instruction and the demonstrations given by him at the school in presence of all the pupils.

In the near future, sufficient trees and shrubs will be available from this nursery to make ornamental plantations on school grounds. The school grounds selected for the purpose will be those of the district having the best school garden, according to the representative or instructor.

It is believed that this plan may induce a love for trees and flowers on the farm, and promote fruit culture.

II.—TEACHING METHODS OF FRUIT CONSERVATION

Realizing the importance of this industry in domestic economy, the Department decided last year to organize a special division of the Horticultural Branch, to work towards its extension and improvement.

On his return from a mission to the United States, Mr. Grise, B.S.A., officer in charge of this section prepared a programme, the main parts of which are as follows:—

1.—Educational campaign in favour of a greater production of small fruits and vegetables.

During the lectures given on this subject, a special endeavour was made to encourage the farmers of a district to grow the same varieties.

2.—Free distribution of seeds of vegetables to young women's clubs.

3.—Educational campaign on the best methods of conservation of horticultural products, with demonstrations. The lecturer makes a free distribution of all literature published by the Department on this

subject and gives demonstrations on canning, making of jellies, with the equipment that he has for the purpose. This equipment includes some of the machines that are the most commonly used on this continent as well as various models of sealed containers, etc.

Practical demonstrations are given at the short courses on domestic science, district or school horticultural fairs, including the centres where horticultural societies and young women's clubs are found.

5.—Special advantages given to members of various horticultural societies in the purchase of materials required.

6.—Organizing of competitions, distribution of prizes to the most worthy competitors.

There has been such a number of requests for information and demonstration that our staff has been unable to meet the demands and it has not been judged advisable therefore to advertise by means of posters.

The development which this domestic industry appears to be taking in this province gives us the hope that it will cause a large number of agricultural vocations to be taken up by the women folk of the rural population.

ONTARIO

A RURAL SOCIAL AND BUSINESS SURVEY IN PEEL COUNTY

BY JUSTUS MILLER, B.S.A., ASSISTANT COMMISSIONER OF AGRICULTURE

COMPREHENSIVE agricultural surveys are to be conducted in the province of Ontario. The first of these is at present under way, and has taken the form of a complete business and social survey of the representative township of Caledon in Peel County. It is hoped in this township to get at the root of the rural problem; to discover to what extent farming is a profitable business; to secure definite

proof whether farm life, having regard to all the controlling factors, is favourable to the development of contentment, enthusiasm and the highest type of citizenship, and whether the farmer has confidence in his business to develop it to the logical limit; to ascertain the viewpoint of the farmer and his family toward the farm and farm life; to get at the heart of the financial, business and economic factors which govern

his business; to study farm methods as practised; to consider the home the school, the church, organized bodies and the community spirit in their relation to the efficiency, happiness, social conditions and welfare of the people.

When this information has been secured, completely analyzed and made scientifically accurate, yet practically applicable, the deductions will be presented to the people of the township, to see whether it be satisfactory or otherwise, and with their co-operation to formulate a clear and progressive policy for the future. The general results of the survey will be presented to the public in bulletin form as representative of that section of the province in which Caledon Township is situated.

As a very great deal of work is involved in such a complete survey the assistance of several officials in the provincial service who are particularly interested in, and who had made a study of rural surveys, was enlisted. Mr. A. Leitch of the Ontario Agricultural College, who had charge of the rural surveys in the province, is general supervisor, while Mr. J. W. Stark, District Representative for Peel County, Mr. Alex. MacLaren, lecturer in Rural Sociology at the Ontario Agricultural College, and the Assistant Commissioner of Agriculture are personally directing the different phases of the work.

In order to secure the co-operation and sympathy of the people of the township for the project and their active co-operation during every stage while the survey was being conducted, in formulating a progressive policy of improvement when results were analyzed, and after that in putting it into effect, the township council were asked by the District Representative to express their view in the matter. They promptly indorsed the proposal in a resolution sent to Dr. G. C. Creelman, Commissioner of Agriculture for Ontario, tendered their services as an advisory

committee, and offered to assist as individuals at any time and in any way required.

A resolution was passed endorsing the project and recommending that a meeting of representatives of all the various organizations of the township be called to discuss details of organization and general plans. The council also called two meetings at different points in the township, inviting rural leaders, ministers, teachers, business men and representatives of all organized bodies in the township for the purpose of discussing the survey in detail. Very representative gatherings occurred despite the bad weather which prevailed during early June, and the matter was well threshed out. At each meeting there was passed a unanimous resolution endorsing the action of the council and tendering the assistance of all present in the furtherance of the work.

The survey consists of six schedules. One concerns the school and is located by the teachers, and a second by the secretaries of trustee boards. One analyzing religious and church affairs is handled by the ministers. The fourth treats all organized bodies (apart from religious organizations), and is in charge of the officers of these bodies. The fifth is a community survey, and is made by the District Representative in co-operation with other officials. The last consists of a comprehensive questionnaire to be answered by every farmer in the township.

Already the school and church schedules have been completed. The community and organization census is at present under way. The farmers' questionnaire will be taken to every home by personal visit in the fall, as soon as the season's crops are disposed of, probably beginning early in October. Shortly before that time a survey sermon will be delivered from every pulpit, on a fixed date, while a letter will be sent to each farmer by the township council asking his sympathy and support

in the work. From the beginning the local county press has taken an interest in the work, has published explanations regarding the survey, and reports of the meetings, and in a most commendable way has helped to make public and popularize the project.

A large map of the township was prepared showing the locations of all lines of communication, villages, schools, churches and farms. With the information given on this map one may find at a moment's notice the name of each farmer, the exact location of his farm and how best to reach it and the number of acres it comprises. Each school section—the unit of survey—is also shown. From the original a number of blue prints have been taken to be used in connection with the various schedules as hereinafter explained.

Filling the farmers' questionnaire is by far the hardest problem of all, as can be readily understood when it is considered that there are approximately 600 farmers in the township and something over 1000 sections in the questionnaire. To prevent taking up too much of the farmers' time two divisions are made. The first contains those questions which it will be necessary to ask each individual—about one quarter of the entire number on the questionnaire. The second comprises the whole list and will be asked of 100 farmers. So far as is practical, arrangements will be made ahead of time to visit these latter at night. No distinction, of course, will be made in the selection of these 100 farmers, as it will be necessary to get men representative of all degrees of prosperity, and the reverse, so that the sum total will be truly representative of the whole township. It is expected three men will be able to visit all the 600 farmers in this way and fill out the questionnaire in not more than two months.

The questions asked of all the farmers are grouped under the following heads:

Tenure.—The purpose is to discover just how the land is held, whether tenantry is on the increase or decrease and the consequent effect upon agricultural and social conditions.

Home and Family.—In this division a survey is made of the family and family life, the nationality, how many members have left the farm and why, school and church attendance and the membership the family represents in organized bodies in the community; a complete resumé of working and living conditions in the home and labour saving conveniences; the attitude of the family toward farm life; arrangements regarding family partnership in the business affairs of the farm.

Farm Plan.—Here is considered the lay-out of the farm regarding acreage and crops, improvements, etc.

Live Stock.—A complete account of live stock holdings regarding numbers, quality and management is requested.

Farm Methods.—This division considers the seed grain, varieties and mixtures sown, manure and commercial fertilizers used, rotation of crops, cultural methods in fields and orchards, methods of feeding and general principles and practices of farm management.

The hundred farmers who will be selected to reply to the complete questionnaire will be asked all the foregoing together with the following:

Farm Equipment.—This division includes buildings and equipment, implements of all kinds and the care given. An endeavour will be made to discover to what extent over, and under, equipment in these exist, and the consequent influence upon profits.

Rural Economics.—This is perhaps the most difficult section of all. It seeks to discover the total capital represented by each farm in land, stock and equipment, labour expended both by family and hired help, the productive labour of women on the farm apart from household duties, the receipts from all departments of the farm and from outside

business, the expenditures for business and personal reasons and finally the labour income.

Roads and Transportation. Organization and co-operation. Education, academic and practical. The church and church life. Social conditions, and health and safety, are the other divisions, each of which is treated very thoroughly, yet is summarized sufficiently to prevent the farmers' patience from being over-taxed.

The school schedule treats of equipment, attendance, the teacher, curriculum, school activities, aside from curriculum, school as social centre and its community relationships, medical inspection of children, total expenses and total township expenses at present as compared with those of a consolidated school; while the church schedule considers organization, equipment and finances, membership and meetings, the Sunday School, young people and the farm, religious organizations, recreations and amusements provided by the church, church growth and the minister. Each teacher, secretary of school board and minister in the township was visited personally and the schedule filled out at the time.

The rural organizations census calls for the name in each case, the purpose of the organization, the value of equipment, amount of annual expenses, list of members, its progress, the essential features of the rules and by-laws and methods of organization. Maps will be prepared showing the various head-

quarters, while the members will be connected with them by lines. It will show graphically how unevenly, in many cases, the membership of even the most important agricultural societies are located.

In the general community survey to be compiled by the District Representative and his colleagues, such matters will be treated as: the total acreage of the township, the acreage of arable, untillable and undrained land, the average investment per farm compared with the least and most successful farms, funds spent in general labour, market, financial and economic conditions, etc.

When the analysis is completed striking diagrams will be drawn and maps prepared showing organizations, membership, school and church attendance, etc. Then a series of meetings will be instituted in every school section. Local leaders who have proven most enthusiastic in the work will be consulted and all the people will be invited to attend. While each individual's business will be considered as absolutely confidential, general conditions in the community will be discussed and the farm methods and management of the most successful farmers used as evidence. Conditions, good and bad, will be shown in sharp relief and a programme of suggested improvement drawn up. With actual facts as a basis, it is expected that important and lasting results will follow, both for the community and for Canada.

INCREASE IN HOG PRODUCTION—A PRACTICAL PROPOSITION

UNDER instruction from the Minister of Agriculture for Ontario, a scheme has been put into motion for the encouragement of hog production that has a practical ring. The endless chain method has been adopted. In the first instance a memorandum was addressed to every District Representative in the province, asking for

a report on the hog situation in their respective domains. Forty per cent of the answers were to the effect that hog production had increased, thirty-five per cent reported a normal condition, the remaining twenty-five per cent reported a decrease, giving as the reasons for this the high price of feed, the scarcity of labour and the cost of milk, con-

sequent upon the demand by condensing factories and in urban centres. The next move was to invite each Representative with three leading farmers in each county to attend a conference in Toronto on November the 6th. On that day from 160 to 175 District Representatives and representative farmers were present to hear an address from Hon. W. J. Hanna, Food Controller, and other testimony as to the seriousness of the situation, not alone in Europe but in the whole world. The delegates to this meeting were asked to go back to their homes and to arrange a conference in each county, to be held on November 16th, of two active members from each Farmers' Institutes and other agricultural societies. Those who attended the meeting in Toronto would convey the information they received at first hand to their representative fellow-farmers of the county. These again were to be asked to return to their respective townships and to call meetings at different points, of the farmers in the neighbourhood to the extent of two representatives of the localities in every instance. Those present at these township meetings, in turn, were requested to

travel along the concession lines and to inform every separate farmer of the evidence they had of the necessities of the situation. Thus every farmer in the province would be reached. From all these conferences typewritten reports are expected of exact details of what the farmers propose to do, as well as of the general situation in the locality involved in every instance. The Assistant Deputy Minister of Agriculture for the province, Mr. C. F. Bailey, to whom the direction of the scheme has largely been entrusted, in furnishing the details, also announced that the 190 brood sows at present on the Government farms in the province would be increased to 600 as an example of the definite earnestness of the Provincial Government to do their share towards the increase of hog production. It is also proposed to endeavour to have village and township regulations so changed as to allow villagers to keep pigs. A further provision is an arrangement whereby the garbage, suitable for feeding, from military camps, hotels, restaurants and private houses, will be conserved and distributed for that purpose.

PREMIUMS FOR STALLIONS

BY R. W. WADE, SECRETARY, STALLION ENROLMENT BOARD

THE Ontario Department of Agriculture, wishing to encourage the keeping in the province of stallions of the highest type, have instituted a premium system. Only horses having, or eligible to receive, the highest of the four forms of certificate, issued under the Stallion Enrolment Act, shall be entitled to participate in the premium system. All horses coming in this class shall be entitled to receive a special inspection by a select committee of horsemen called the Premium Inspection Board. Inspection by this Board has been made at the Canadian National Exhibition, Toronto, Western Fair, London, and

Central Canada Exhibition held at Ottawa. Provision has been made for further inspection at the Guelph and Ottawa Winter Fairs this coming winter.

Horses found by the Premium Inspection Board to be sound, of superior conformation, character and type, shall be entitled, on being enrolled, to receive a certificate which will entitle the owner to a premium according to the number of foals sired in the premium year as follows:—

- (a) From 35 to 59 foals. \$50
- (b) From 60 foals and upwards. . . \$100

The first premium certificates will be awarded for 1918.

EXPERIMENTS WITH LIME

BY ROBERT HARCOURT, B.S.A., PROFESSOR OF CHEMISTRY

IN connection with our soil survey work, we have been carrying on a number of lime experiments particularly upon heavy clays. Similar experiments are carried on on muck soil and others of like nature. So far as is practicable we secure the co-operation of the District Representatives. One of these experiments has been going on in Welland county for two years under the immediate supervision of Mr. E. K. Hampson, B.S.A., District Representative. The plan of this particular experiment is as follows:--

No. of Plot.	Fertilizer Applied	Rate acre tons
451	No lime	
452	Ground limestone	2
453	Ground limestone	5
454	No lime	
455	Ground limestone	5
456	Ground limestone.	10
457	No lime	
458	Ground limestone.	10
459	Ground limestone.	15
460	No lime	
461	Ground limestone.	20
462	No lime	
463	Fresh lime.	2
464	Fresh lime	4
465	No lime.	
466	Fresh lime	4

467	Fresh lime	6
468	No lime	
469	Gypsum.	1300 lb.
470	Gypsum	1 ton

Mr. Hampson, in reporting upon this experiment for this year, gives the following deductions:--

(1) Ground lime-stone in every case showed an increased yield.

(2) That the clover on the lime plots was much more luxuriant than on the unlimed plots, which seemed to have a preponderance of blue-grass. On this account the weights obtained are not an exact index to the value of the lime as blue-grass weighs very heavily.

(3) That Gypsum gave an increased crop of hay over the check plots, but that it cost much more than the ground lime-stone, and was not any more efficient.

(4) That the slaked lime showed good results where the clover was not killed out. Unfortunately the slaked lime was applied in the spring to the young clover crop, and some of it was killed, but where the clover survived, the plants were all strong and showed a marked improvement on the unlimed plots.

(5) Moderate applications of lime, five tons per acre gave practically the same results as plots having larger applications. As there was over a ton of hay on the plots we had considerable trouble in getting the results of this experiment, but they should be of great value to the district surrounding Stevensville.

FRUITS FOR MILITARY HOSPITALS

CONTINUING the policy of last year, the Ontario Department of Agriculture will supply canned and preserved fruit to the overseas military hospitals this year. In response to an appeal from the Ontario Agent-General in London, England, the Department has undertaken to prepare and send two million pounds of canned fruits and jams. Of this quantity some eight hundred thousand pounds will be put up at the Vineland Experimental Station in the small experimental cannery. The package exclusively used is the gallon sanitary can which requires no solder for the cap. This can

makes an ideal size for hospital use. Already the following quantities have been put up and are awaiting shipment:--

Strawberry Jam.	3,900 gals.
Raspberry Jam.	3,350 "
Black Currant Jam.	2,250 "
Blackberry Jam	2,200 "
Canned Sour Cherries.	2,250 "
Other Canned Fruits.	250 "
Jellies	325 "

The heaviest part of the pack will be, as in 1916, canned peaches with a considerable quantity of plums and pears. The factory has been running night and day on these fruits, the season for which being considerably later than last year.

MANITOBA

BETTER FARM HOMES

BY L. J. SMITH, B.S., PROFESSOR AGRICULTURAL ENGINEERING

THE Manitoba Agricultural College, through the Agricultural Engineering Department, is contributing a service calculated to improve the homes of the farmers of Manitoba. In the summer of 1916 the college in co-operation with the Department of Agriculture inaugurated a better farm home competition

vice now being inaugurated. The plans are being redrawn by capable draughtsmen under the direction of the Agricultural Engineering Department, which also prepares a complete bill of material and a set of specifications for each plan. These are being made available to residents of the province at a nominal fee,



open to the farm women of the province. As a result of this competition sixty-three plans were submitted and of these, five were selected by the judges as being worthy of prizes. Each of the five contributors was awarded \$25 in value, in the form of cutlery or silver ware. These plans are being used as a basis for the ser-

and for those outside of the province a slightly larger fee is required. The agricultural papers are publishing the floor plans and exterior view of each prize plan. When all have been published in this manner they will be distributed in bulletin form together with other information on farm houses.

THE USE OF THE FARM TRACTOR

BY L. J. SMITH, DEPARTMENT OF AGRICULTURAL ENGINEERING, AGRICULTURAL COLLEGE

THE Manitoba Agricultural College purchased a 10-20 kerosene outfit this spring for use on the farm, and it has given very good satisfaction. We started with an operator who had had practically

no experience with a gas engine, and while he was a very good man, he was held up quite often because of the small points in the operation of the tractor that he did not quite understand.

Our experience here, and in connection with our college work, in traction engineering, has been that it is almost absolute folly for a man to expect to get satisfaction out of the gas tractor, and especially in a kerosene tractor, if he has had no previous experience with gas engines. If one has operated an automobile, or a small stationary engine, for some time, long enough to come up against some of the ordinary troubles, he will find that this experience will be of considerable value; but, if I were a farmer, I would not think of purchasing a tractor without first taking a short course in traction engineering. The time and money spent on such a course will come back probably seven times in the first season's run of the tractor. Then, too, if the operator does not understand the ordinary necessary details in the up-keep of the gas tractor, his machine will lose from one-third to one-half its power before the season is half gone, and the fuel economy of the engine will also be cut down very much.

From either standpoint, therefore,

I would advise no farmer to buy a gas tractor without first having taken a course in gas traction engineering. These courses can be had from agricultural colleges, and from the various traction firms themselves. Quite a number of prospective buyers visit the factory and spend a month or so in becoming familiar with the engine where it is being built. This is a very good idea, and should be followed by more prospective buyers.

Thus far, we have no data in regard to the amount of work done, or the fuel consumption from our tractor. I do not consider such data of as much value if taken during the first year of the tractor's use when it is new and all the parts in fairly good condition, as if the data were taken during the second year, when the results would approximate the conditions that might be expected during the life of the tractor. We expect next summer to take up this matter, and get some definite information that will be of value to those who contemplate replacing some of their horses with a small farm tractor.

TO IMPORT BREEDING SHEEP

THE Department of Agriculture is assisting farmers in the province to acquire breeding ewes. Farmers are invited to place their orders with the Department for the number of sheep they desire to purchase. The sheep will be secured in so far as they are available in the province of Ontario, principally from the stocks of ewe lambs that are being sold by the Ontario sheep breeders. Should the orders secured be greater than can be supplied from Eastern Canada, importations will be made from the Northern States, more particularly Montana.

The Manitoba Department will select the sheep, pay for them and arrange for their distribution. The Dominion Department of Agriculture with the assistance of the railways will meet the freight charges on the sheep from Ontario in carload lots as outlined in the new transportation policy published in the October GAZETTE. Before the middle of October some four thousand sheep had been applied for. The farmers are required, when placing their orders, to prepay one dollar per head and to make the remainder of the payment when the sheep are delivered.

SASKATCHEWAN

ACTIVITIES OF THE DEPARTMENT OF AGRICULTURE

CO-OPERATIVE POULTRY MARKETING

TO facilitate the marketing of poultry the Department of Agriculture has again arranged to operate co-operative poultry killing and marketing stations at Regina and Saskatoon. Commencing on November 5th, poultry will be received up to and including December 8th.

Chickens, turkeys, ducks and geese will be handled, and the Co-operative Organizations Branch will make advance payments at the following rates, namely, For No. 1 chickens, 15 cents per pound; No. 1 fowl, 12 cents per pound; No. 1 turkeys, 18 cents per pound; No. 1 ducks, 14 cents per pound; No. 1 geese, 14 cents per pound, and for lower grades at corresponding prices. If market prices are low at the time poultry is received, it will be placed in cold storage until it can be sold to advantage, and when all the birds have been disposed of a final payment will be made, returning to the producer the full amount realized, less the cost of transportation, killing boxes and storage charges.

One notable change, and practically the only one, has been made in the regulations for this year's operations. All payments will be based on the live weight of the birds, when fasted and ready to kill, therefore, all birds must be sent in alive.

Last year 59,422 pounds of poultry were handled as against 27,038 pounds in 1915. It is expected that the same rate of increase will be fully maintained this year.

To advertise this co-operative poultry marketing work the Department has issued a conspicuous poster, printed in colours, announcing the

conditions under which the poultry will be handled and giving instructions to enable producers to participate in it. These posters are exposed on the bulletin boards of banks and in other conspicuous places.

LIVE STOCK DISTRIBUTION

Up to the present time the Live Stock Branch has been successful in purchasing the majority of the cattle supplied under The Live Stock Purchase and Sale Act from Saskatchewan farmers who were over supplied with this class of stock. To secure an additional supply a representative of the branch is now purchasing in Winnipeg. Over two hundred head of grade heifers, one and two years old, besides the pure-bred bulls and dairy cows, have been supplied and orders are on hand for another two hundred head, which it is hoped to secure within the next few weeks.

The branch has received some orders for sheep, and many enquiries are also being received so that a big demand is assured which is the natural consequence of the high prices for both wool and mutton now prevailing. About two thousand head of grade range ewes from one to four years old have been purchased for October delivery in anticipation of this demand.

A few applications for stock under the Act have already been received from returned soldiers, and it is expected that the regulations and special terms to be granted these men will shortly be published. The sheep and swine sales are to be held at the time of the winter fairs, namely on November 30 at Regina and on December 6 at Saskatoon.

BRITISH COLUMBIA

THE UNIVERSITY AND AGRICULTURAL INSTRUCTION

BY V. S. KLINCK, DEAN OF THE COLLEGE OF AGRICULTURE

IN British Columbia the College of Agriculture is an integral part of the Provincial University. Its class-rooms and laboratories are located on the same campus as are those of the other faculties of the university. During the coming year lectures in agriculture will be given in the temporary quarters occupied by the university in Vancouver; while laboratory-work will be given in the fields, gardens, and live-stock stables at the permanent site at Point Grey.

For the past three years land-clearing operations and field experimental work have been proceeding at the permanent site. One hundred acres of land have been cleared and are now under crop. The experimental results obtained during the past two years have proved of much value in determining the most approved methods of bringing heavily timbered upland soils into cultivation. The allotments of land made to the different departments have been especially prepared for experimental and investigational work. These lands—the farm-fields, the agronomy grounds, and the horticultural gardens and orchards—constitute the more important field laboratories of the College of Agriculture.

A substantial two-story horticultural storage-barn has been erected and funds are available for the erection of such additional buildings and for the purchase of live stock and general farm equipment as are necessary for the teaching of the different subjects in the courses outlined.

THE LINES OF STUDY

Two distinct lines of study are offered, as follows:—

(1) A four-year course leading to the degree of B.S.A.

(2) A series of short courses.

Before entering upon the course leading to the degree of B.S.A., students in agriculture are required to have junior matriculation, or its equivalent. This degree is granted only after the successful completion of four years of lecture and laboratory work. The course is planned for students who wish to obtain a practical and scientific knowledge of agriculture, either as a basis for demonstration and teaching or as an aid to success in farm-management.

The first two years of work leading to the degree in agriculture is devoted to acquiring a knowledge of the basic sciences upon which agriculture rests, in adding to the students' knowledge of mathematics and language, and in laying a foundation for more advanced studies in practical agriculture. The third and fourth years are devoted almost wholly to courses in applied agriculture.

Except under special circumstances students will not be eligible for registration under the age of seventeen. Specialization will begin at the commencement of the third year.

SHORT COURSES

The work of the short courses is intensely practical. Lectures are reduced to a minimum. Illustrative material and periods devoted to demonstration and judging work are strong features of the courses. No entrance examination is required, nor are students asked to write an examination at the conclusion of the course.

The first short course to be offered this fall will be given in horticulture, and will extend from November 20th to November 30th, inclusive. The time in this course will be devoted entirely to commercial fruit-growing, vegetable gardening, and related subjects. If interest warrants it, a special course of one week will be offered in amateur vegetable-gardening, landscape-gardening and floriculture.

The second course will be a combined one in agronomy and animal husbandry, and will be arranged to meet the needs of the general farmer. Under agronomy soils and their management, field crops and their cultural requirements will be studied. Under animal husbandry special attention will be given to the judging of all classes of live stock and to their care, feeding, breeding and management. Special courses will be arranged for returned men who are

desirous of taking up farming, and a two weeks' course in poultry husbandry and apiculture will be announced if negotiations now under way result in satisfactory arrangements being made.

SCIENTIFIC BASIS OF AGRICULTURE

For the past two years a course on the scientific basis of agriculture has been given as an elective to junior and senior students in arts. The first short course to be given under the auspices of the university was offered last February and proved a decided success. During the past six months the members of the Faculty of Agriculture have been assisting the provincial Department of Agriculture in numerous short courses in different parts of the province. They have also rendered valuable assistance to the Department of Education in connection with the summer school for teachers.

STALLION ENROLMENT IN CANADA

RETURNS FROM EACH PROVINCE FOR THE PRESENT YEAR

Stallion enrolment now exists in all the provinces of Canada excepting New Brunswick and Quebec. From returns received at the office of THE AGRICULTURAL GAZETTE the following table has been compiled, showing the number of enrolments for the present year in each of the provinces:

Breed	P.E.I.	N.S.	Ont.	Man.	Sask.	Alta.	B.C.	Totals in breed
Clydesdale	21	46	1038	499	1466	135	40	3245
Percheron	3	12	299	157	695	114	14	1294
Shires	1		42	6	39	9	2	99
Suffolk			3		26	3	3	35
Belgian			19	25	124	13	3	184
French Draft							5	5
French Canadian			1	3	1			8
Standard-bred	29	50	280	36	118	5	6	524
Thoroughbred			31	1	16	4	6	58
Hackney		3	60	21	32	2	8	126
French Coach		1	6	3	5	1	2	18
German Coach			7	3				10
Saddle Horse				1	2			3
American Trotting							4	4
Morgans		1		1	1			3
Ponies and Morgans			4		1			5
Totals..	54	113	1793	756	2526	286	93	5621
Grades.		152	640		336	196	18	1342
Scrubs.					360			360
Total No. of horses enrolled in each province	54	265	2433	756	3222	482	111	7323

PART III

Rural Science

NOVA SCOTIA

RURAL SCIENCE TEACHERS AND SCHOOL GARDENS

BY A. H. MCKAY, B.A., LL.D., SUPERINTENDENT OF EDUCATION FOR NOVA SCOTIA

IN preparing teachers for rural Science, we select from the Normal College the most promising teachers, and after the college closes in June they do special work in July and August. If the teachers do not complete their work then they can cover it at the next vacation and obtain a special license, for which they get an extra grant in the school, and then they are expected to do the special work already described.

The school gardens have not been very successful, because during the long vacation in July and August they are apt to run to waste. We made a change in our regulation allowing school trustees to arrange for a visit to those gardens during July and August, and to count every visit as a day's attendance at school for the pupils immediately concerned, so that in the return they would draw on the municipal fund for those days, but the amount appeared to be so small that not much use has been made of the regulation, so we are turning now to home gardens, or as some call them, home projects.

THE PLAN FOLLOWED

The home garden must be very carefully described; there must be lying on the teacher's desk a plan of the garden drawn to scale, and a plan of the different beds, with what is raised in each of them, and the pupil has to report every week on that work, so that these gardens are nearly as well supervised as those at the school, on account of the plans. Then there is this advantage, that at the end of June the garden looks very flourishing and those at home are greatly interested in keeping it in good order so as to have something to send up to the county or local exhibition. Photographs are made and published in a bulletin for the encouragement of others.

We have over 100 teachers this year who have been drawing an extra grant of \$15, \$20, \$25, or more. We give professional grants up to \$75 or \$90, but we laid down standards so high for those higher schools that few come up to them. I think we are gaining when we give a grant that makes it worth while for people to compete with each other.

RURAL SCIENCE ACTIVITIES

BY L. A. DEWOLFE, B.A., DIRECTOR, RURAL SCIENCE SCHOOLS

CHILDREN'S home school gardens constitute an important part of the Rural Science work carried on in the province of Nova Scotia. Reports have been received of 4,176 children's home gardens planted last Spring. These covered an area of forty-two acres. Of the schools that reported, Sydney leads with 1024 gardens, having a combined area of five acres. Besides the general gardens, local contests were organized as follows:—

	8 schools organized hog	raising contests
8	" " calf	" "
5	" " lamb	" "
13	" " chicken	" "
14	" " potato	" "
6	" " turnip	" "
3	" " mangel	" "
3	" " grain	" "
5	" " cooking	" "
4	" " canning	" "

In the Rural Science Bulletin, of which the writer is editor, teachers are urged to report the results of these contests and to assist the children in securing photographs of their gardens.

RURAL SCHOOL CONSOLIDATION

IN further explanation of matter that appeared on page 901 of the October Number of THE AGRICULTURAL GAZETTE, Mr. A. H. McKay, Superintendent of Education for Nova Scotia, writes:

"As the summary of the application of the Provincial Act of 1903 in aid of School Consolidation that appears on page 901 of THE AGRICULTURAL GAZETTE may be misunderstood, I state the regulation more fully as follows:—

\$36,000 (an average of \$2000 for each county) was voted by the Nova Scotia

Legislature (Statutes of 1903, Chapter 22) to aid the consolidation of school sections.

The Council of Public Instruction under this Act ordered that, subject to special condition, from \$200 to \$250 of the said \$36,000 may be granted to aid in the erection and equipment of the school building of the consolidated section for each normal-sized rural section absorbed in to the central one—the total in no case to exceed \$1000. Thus, a consolidation of two sections may receive for the building \$200; of three sections, \$400; of four sections, \$600; of five sections, \$800; of six sections, \$1000—the maximum—when the normal unit of \$200 is applicable.

ONTARIO

EXAMINATION AT SCHOOL FAIRS

BY E. K. HAMPSON, DISTRICT REPRESENTATIVE, WELLAND COUNTY

IN our school fair work I have replaced the requiring of a written essay by the pupils with an agricultural examination. During the summer I sent a list of questions to all of the boys and girls who had plots. Immediately upon the opening of the schools after the summer holidays, a set of these questions was

placed in the hands of the teacher with a request that assistance be given the pupils in answering the questions submitted. In order to assist the pupils, I sent to each school a set of bulletins issued by the Dominion and Provincial Departments of Agriculture on live stock, horticulture, field crops and other subjects.

These were to be made available to the pupils in preparing for the examination and form the nucleus of an agricultural library in the school. At each fair examination papers based on the questions previously submitted were given to the pupils. In the case of one of the school fairs, more than forty of the pupils competed. Special prizes including a silver medal were awarded to the winning pupils. This method is proving one of the most valuable educational features of our school fair work and I intend to continue it in following years.

Following are the questions sent to the boys and girls:—

QUESTIONS FOR BOYS

1. Name 3 prominent breeds of heavy horses.
2. Name 3 prominent breeds of swine.
3. Name 3 prominent breeds of beef cattle.
4. Name 3 prominent breeds of sheep.
5. Name 3 prominent breeds of dairy cattle.
6. Be prepared to write a short essay on "How I would feed a Dairy Calf."
7. Name two good varieties of oats.
8. Name two good varieties of fall wheat.
9. Be prepared to write a short essay on "The preparation of the ground for Seeding."
10. Name five varieties of fowl which might be termed General Purpose Fowl.
11. Name two varieties of fowl which are noted specially for egg production.
12. Be prepared to write a short article on "Feeding and Caring for Young Chickens."
13. The kind of house in which your hens live is important. What are the essentials which one must observe in building an ideal poultry house?
14. Name ten weeds which grow in your locality.
15. Explain the difference between Annual, Biennial, and Perennial with reference to plants.
16. Be prepared to write a short article on "How to Control Weeds".
17. Name five insects which are injurious to crops, orchard or garden.
18. Be prepared to write a brief description of the life history, nature of injury and methods of control of the following: Cabbage Worm, Potato Beetle, White Grub.
19. What are the four different stages in the life of an insect.
20. Name 3 diseases of crops, fruit or vegetables which are caused by a fungus.
21. What are the methods of prevention of: (a) Smut in oats; (b) Blight of potatoes; (c) Worms in Apples.

QUESTIONS FOR GIRLS

1. Define:—Embroidering, hemstitching, tatting and crotcheting.
2. Be prepared to write a short note on "The Baking of Bread."
3. Give the name and amounts of ingredients used in making plain white cookies.
4. Name some vegetables suitable for canning.
5. Be prepared to outline briefly the method of canning vegetables.
6. Be prepared to outline briefly the method of preserving fruit.
7. Name (6) annual flowers suitable for a border or bed in the lawn.
8. Name (6) perennial flowers suitable for ornamenting the lawn.
9. Be prepared to write a short article on "How I would improve the front lawn".
10. Name (3) varieties of shrubs suitable for a low hedge.
11. Name (3) varieties of shrubs suitable for the lawn.
12. Name (3) varieties of vines suitable for covering fence or buildings.
13. Be prepared to write a short article on "The preparation of the garden for sowing".
14. Be prepared to write a short article on "The value of a vegetable garden to the farmer".
15. Name (10) kinds of vegetables suitable for growing in a farmers garden.
16. Name (3) kinds of fowl which might be termed "General Purpose Fowl."
17. Name (2) kinds of fowl which are specially noted for egg production.
18. What would you consider a good mixture to feed a flock of hens to stimulate egg production.
19. Be prepared to write a short article on "The feeding and care of young chickens".

NEW BRUNSWICK

AGRICULTURAL INSTRUCTION, NORMAL SCHOOL, FREDERICTON

BY R. P. GORHAM, DIRECTOR OF AGRICULTURE AND NATURE STUDY

THE students in the Normal School at Fredericton, who receive agricultural instruction, are divided into five classes. Two of these classes are studying for first class licenses and three of these for second class licenses. There is a small additional class of French students.

The students working for second class licenses, have two forty minute periods a week for Agricultural and Nature Study. The other classes have three small periods per week. I find a forty minute period too short for laboratory work but I am endeavouring to teach every lesson from an object in the hands of the pupils and as far as possible to connect each lesson with their everyday experiences.

The following is an outline of the course covering the school year:—

September:—Study of food plants in school garden, corn, bean, potato, tomato. Collection of weeds, identification of all weeds found. Collection of eight types of economic plant diseases.

October:—Study of food plants continued, carrot, turnip, grain, apples. Harvest practices and reasons. Collection of weed seeds, identification and study of methods of dispersion.

November:—Fall care of the school garden, fall work on the farms. Preparation of plants for winter. Types of soils.

December:—Trees, fur-bearing animals, snow and ice.

January:—Domestic animals, breeds of cattle, uses and care. Winter birds.

February:—Study of plant diseases collected in the fall. Lumbering and values of lumber.

March:—Seed germination, movements of sap, spring birds, insect life.

April:—Seed selection, preparation of hot beds, fertilizers, school gardening.

May:—Farm practices, rotations, inside life.

QUEBEC

MACDONALD COLLEGE

SCHOOL LUNCHES IN RURAL DISTRICTS

BY JEANNETTE BABB, HOUSEHOLD SCIENCE ASSISTANT

THE Household Science Department of Macdonald College has made an effort through its Extension Department, aided by the Homemakers' Clubs, to show how conditions can be improved in our rural schools and academies. Among other undertakings, a demonstration on "The School Lunch" has been given in a number of rural schools and in several of the academies throughout the province, in cen-

tres where there is a Homemakers' Club and in other schools which had asked for it. During the past year this demonstration has been given in 27 different places where there were Homemakers' Clubs.

IMPORTANCE OF THE LUNCH.

Too often the school lunch is looked upon as a sort of refreshment between meals. It, however, takes the place of the main meal of the

day with the majority of children, and, therefore, requires the most careful planning and attention, more so than the regular meals of the rest of the family, because the school lunch is very often eaten amidst dreary surroundings and not in a cheery, clean dining room with the other members of the family. In the majority of schools the children have liberty to eat their lunch where and how they choose, and the manner in which it is partaken of is not conducive to health. For these reasons the food should be especially tempting and nourishing. The choice should include such foods as stimulate the appetite by supplying both daintiness and variety. The lunch for the growing boy and girl should be planned with particular care in order to satisfy the demand for good taste and to supply the proper amount and kind of nourishment. The factors to be considered in planning the box lunch, either with or without the hot supplement, fall naturally under four heads:—

1. Selection of foods.
2. Preparation of foods.
3. Packing the lunch.
4. Serving the lunch.

SELECTION OF FOODS.

The most important of these is the selection of foods. They must supply the demands of the growing boy or girl. What are these demands? They may be briefly described as follows:—

1. Foods that supply the growth of bodily tissues, such as nerve, bone, blood and muscle.
2. Those that supply power to work and to play, and give the necessary clearness of brain to study.

The lunch box should always contain such food-stuffs as:

- (1) Those that supply a substantial background of plain nutritious and milk flavoured foods, e.g., bread and butter, bread and egg, bread and milk, sandwiches of chopped egg, nuts, meat, cheese, brown bread in some form.

(2) Succulent foods, e.g. apples, lettuce, celery, tomatoes, dates, raisins, oranges or apple sauce.

(3) A dessert or dainty, e.g. custard or puddings, gelatine jellies, plain cake, cookies, homemade candy or maple sugar.

A good lunch should consist of a combination of one article from each of these groups supplemented by hot cocoa or soup, or in summer plain whole milk. Well balanced meals tend to keep the child in good condition, give him good habits, and make him a table companion.

PREPARATION OF THE FOOD.

The preparation of the food is the next thing to be considered. It must be well cooked. Here is an excellent opportunity for the use of good left-overs. With a little skill many scraps of food that appear unattractive may be made very appetizing and used up in this way, thus practising true economy. Dried cheese may be combined with salad dressing, or cream and seasoning; left over fish may be flaked and mixed with salad dressing for sandwich fillings; stale cake may be made into dainty desserts.

PACKING THE LUNCH.

The third point to be considered is packing the box lunch. This also demands careful attention. A suitable box should be chosen which is light, easy to carry, can be washed and kept in a sanitary condition. We recommend a tin box for this purpose. To aid in packing use paraffin paper for lining the box and wrapping each article separately; paper or crepe napkins, custard cups, jelly tumblers, screw top jars and bottles are a great aid in packing the lunch box, which should be an example of neatness, convenience and attractiveness.

Psychologically what appeals to the eye appeals to the appetite. Unattractive food is not eaten with

relish, and is most likely not eaten at all. Wrap the parcels neatly, putting as far as possible each one in a separate wrapping paper. Place them in the box in proper order, with the heavier ones in the bottom. Whether packed in tin or paper boxes or just in plain wrapping paper see that they are neatly put up. Whenever possible let the children do the wrapping, and teach them to do so carefully and neatly. The pride of the children in carrying a neat and attractive lunch amply repays for the extra effort.

ACCOMMODATION FOR SERVING

Wherever possible the children should have a room set apart for serving the lunch. Where this is not feasible some space should be given over to it in one of the classrooms. It should be put in order and properly aired before the children sit down to their lunch each day. Where tables cannot be supplied the desks should be wiped off by the children. One of the napkins should be used as a table cloth and the lunch spread out upon it. Then the cocoa or soup should be passed around to them in cups or bowls supplied either by the parents or by the School Board, having all the children sit down together as one family to enjoy their lunch. They should also be encouraged to discuss suitable subjects and in this way learn the art of really good conversation. The supervision of the noon hour is very important in the formation of good habits of right living and thinking. The School Board should undertake the furnishing of the necessary equipment, the whole outlay for which need not exceed \$20.00. The cost of fuel amounts to about 3c per day,

the cost of supplies for cocoa for each child per day is 2c, and the cream soup 3c per day.

EXAMPLES

The Lennoxville Academy is the first school to fall in line in the establishment of a supervised lunch room where cocoa is served to the children each day as a supplement to their box lunches. They use a room in the basement which is light and airy. The School Commissioners supplied a built-in cupboard and two table tops which can be set up on trestles. A two-burner oil stove was donated. The Lennoxville Homemakers' Club, with the co-operation of the School Commissioners and Mr. Dormer, the principal of the academy, have helped along this good work. The club, besides providing the other necessary equipment, undertook to supply the necessary materials for each week and pay a woman 25c per day for preparing the hot supplement and supervising the noon lunch. They have supplied a cup of cocoa per day for each child for the small cost of 1c per day and have saved over three dollars since the 1st of March.

Compton Consolidated School and several other rural schools have served a hot supplement during this past year, and the Compton School Board intend providing the proper equipment when their school opens for the fall term. Every community visited reports a great improvement in the quality, packing and serving of the lunches.

NOON LUNCH EQUIPMENT LIST

The necessary equipment for 12 students can be given as follows:—

NOON LUNCH EQUIPMENT LIST

No.	Article.	Description	Price	Cost
A.	Granite Ware.			
1	Kettle	Preserving "Grey" covered 8 qt.	70	70
1	Doubleboiler	"Grey" 4 qt.	1.10	1.10
2	Plates	White 10 inch.	.25	50
1	Ladle	"Enamelled steel", flat handle 4 1/2 inch.	35	35
B.	Tin and Wire Ware			
1	Tray	"Oblong" Japanned, 22 inch. extra heavy	1.25	1.25
2	Measuring cups.	1/2 pt. marked in 1-3s and 1/4s	08	16
1	Strainer	"Fruit" wire with masher	35	35
1	Soapshaker	Wire	15	15
C.	China, Crockery and Cutlery.			
12	Cups and saucers	Best quality, hotel ware 304/3	1.80	1.80
12	Bowls	" " 119/19.	1.50	1.50
2	Bowls	Mixing 10 inch. C. C. rolled edge	.35	70
18	Teaspoons	Heavy, solid nickle	1.00	1.50
12	Dessertspoons	" " "	1.60	1.60
2	Tablespoons	" " "	.18	36
2	Knives	Dinner, case	20	40
2	Paring knives	" " "	15	30
D.	Linens			
6	Dish towels	Plain white towelling 1 yd long, 1/4 in. hems	.14	84
6	Dish cloths	Plain white towelling, 1/2 yd. long, 1/4 in. hems	14	42
4	Scrubcloths	Crash towelling, red border, 1/2 yd. long, 1/4 inch hems.	10	20
E.	Miscellaneous.			
1	Wooden spoon	Round handle, 8 in. size	.20	20
1	Can-opener	" " "	15	15
1	Stove	"New Perfection" Oil No. 2	9.00	9.00

MANITOBA

BOYS' AND GIRLS' CLUBS AND THE PUBLIC SCHOOL

BY S. T. NEWTON, DIRECTOR, AGRICULTURAL EXTENSION SERVICE

IN the elementary schools the boys' and girls' club method of teaching agriculture is very generally followed, and over 15,000 Manitoba boys and girls are enrolled in from three to six of the twelve contests which are included under boys' and girls' club work.

In this work the Department of Education co-operates with the Department of Agriculture, and as a consequence there is no duplication of effort and the best support of all branches of both departments is freely given at all times.

As far as possible the work is made of a practical nature, and for the most part is carried on at home under

the direction of the teacher. In this way the home and school are linked up in such a way that the organizing ability of the teacher is combined with the sound practical experience of the parents as well as other expert farmers in the district, for the boy who is raising chickens is not content until he has questioned the best poultry raisers in the district as to the best methods to follow.

Before organizing the clubs each year the opinions of parents, inspectors and teachers who have met with most success are secured as to the needs for the coming year.

By putting boys' and girls' club work on a contest basis, and having

each contest of real economic value, children as well as parents become interested in this phase of school work. For this reason the number

the children of the province who would naturally be expected to take an interest in the subject.

Further encouragement in club work is given by various mercantile firms in providing a free trip to the Agricultural College, while a whole week of instruction and entertainment for between 35 and 40 of the prize winners is given.

Many of the clubs offer as much as \$500.00 in prizes, and an effort is made to have a prize even though it is small for every child who has done his best. At one fair 22 prizes were offered and by placing all the exhibits the child getting say twenty-first place knew how far up a very long ladder he had been able to climb, whereas if only three

prizes had been given he would not know how many were ahead of him.

At the close of each fair the judges carefully explain the good and bad



ROAD DRAG MADE BY BOYS AT MANUAL TRAINING SCHOOL, KILLARNEY MANITOBA

of participants in such contests as poultry raising, pig raising and gardening is increasing each year. Children who cared for a couple of pigs throughout the summer and sold them at the conclusion of the fair at from \$75.00 to 80.00 not only have a snug sum to put in the bank, but have increased their knowledge in one branch of agriculture in a way that would not have been possible in studying out of books alone.

The total school population in Manitoba is 103,000, and when we deduct 40,000, the number in attendance at Winnipeg and Brandon schools, and probably another 15,000 who are under ten years of age and consequently too young for boys' and girls' club work, it will be seen that the 15,000 enrolled in boys' and girls' club work takes in almost all



STUDENT AT MANUAL TRAINING SHORT COURSE MCCREARY, MANITOBA, AND THE WAGON BOX HE MADE

features of the various exhibits, and these in themselves prove most in-

teresting and instructive lessons in agriculture.

After five years' experience in the boys' and girls' club method of teaching agriculture there are very few people in Manitoba, parents, teachers or inspectors who are not strongly in favour of it, and the problem of

the future is to so organize the work that all the children and teachers will understand what is expected of them.

NOTE—Details of the organization and work of the boys' and girls' clubs in Manitoba will be published in a later issue of THE AGRICULTURAL GAZETTE.—*Editor.*

SASKATCHEWAN

AN EXAMPLE OF SCHOOL GROUND IMPROVEMENT

BY BERT A. SEE, CHAIRMAN, GRIFFIN SCHOOL DISTRICT

PERHAPS I am more enthusiastic over work of this kind than the average rate-payer, at any rate I must confess I am proud of our school and school grounds, I am also pleased to be able to add that many of our tax payers as well as our inspector, our director of school agriculture for the province and I believe the whole Department of Education are proud of it as well.

with wonder and delight when they are told that this has all been done in a season and in addition to the benefits our own people are deriving we have set a pace and set up a model for rural, village, town or even city school districts all over the province. Our building is of brick, fine appearing from the outside and located in the centre of the grounds, inside there are two large sanitary, well-



PLANTING ON SCHOOL GROUND, GRIFFIN, SASKATCHEWAN



AGRICULTURAL PLOTS, COLLEGIATE INSTITUTE, WEYBURN, SASKATCHEWAN

A year ago the first of August the spot where our beautiful new school now stands was but a parcel of unfenced summer-fallow containing about seven acres of land, today we have, and I feel perfectly safe in saying this, the finest and best equipped two-room school and the best fenced, best laid out and best cultivated grounds in the province. People from all parts of the country gaze

lighted, well-ventilated and well-equipped class rooms divided by a noiseless movable partition that can be set aside in a few minutes throwing the building into one large assembly room which was appreciated by community gatherings last winter. The building is also steam-heated throughout and in addition to the class rooms the building contains a well equipped kitchen used in dom-

estic science work as well as warming the noon day lunch when needed. There is also a well equipped science room, two large well arranged cloak rooms and a commodious hall. Under the building is a full basement, the furnace room and a good large coal room in the centre and boys and girls play rooms on either side. The basements are also equipped with well heated lavatories as well as a concrete cistern holding about a hundred barrels of water.

Under the supervision of our groundsman the school grounds have been transformed from a parcel of summer-fallow to a park, beautiful and well kept school gardens, automobile drives, beautiful patches of lawn surrounded by flowers of every description; trees have been planted around the entire grounds for a shelter belt and about one-third of the ground has been set aside and used for experimental plots where agricul-

ture will be taught the pupils. Next year we are planning to make even a greater transformation in the grounds and if possible I would like to arrange for a meeting here of all the school trustees in the province about the middle of August next year so they may see a living example of what can be done in promoting school agriculture in town, village and rural schools.

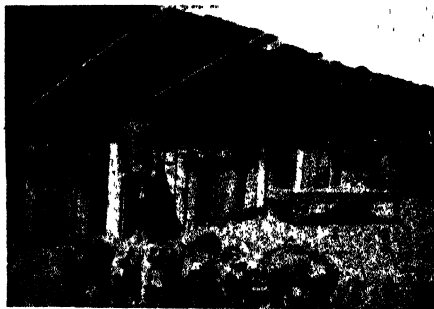
We have received considerable encouragement from Mr. Ross, Chief of Forestry Department, Indian Head, Mr. Vensky, Superintendent of Parks of the city of Regina, A. W. Cocks, Director of School Agriculture, Regina, and also from the Agricultural College at Saskatoon, for which we are grateful and we will appreciate any help or suggestions from any branch of the Department of Agriculture. We are out to set an example.

BOYS' AND GIRLS' CLUB SWINE CONTEST

THE Rural Education Association of Weyburn, Saskatchewan, of which Mr. A. Kennedy, Inspector of Schools, is the secretary, is carrying on a boys' and girls' club swine contest. The accompanying illustration, supplied by Mr. Kennedy, represents a litter of seven Tamworth

pigs entered by Herbert Thompson, one of the members of the club. At the first judging, which

took place on June 9th, this litter won thirty-eight points out of a possible fifty, while at the second inspection, two months later, fifty-five out of a possible seventy-five points were secured.



A CONTEST LITTER

SCHOOL GARDENING IN 1917

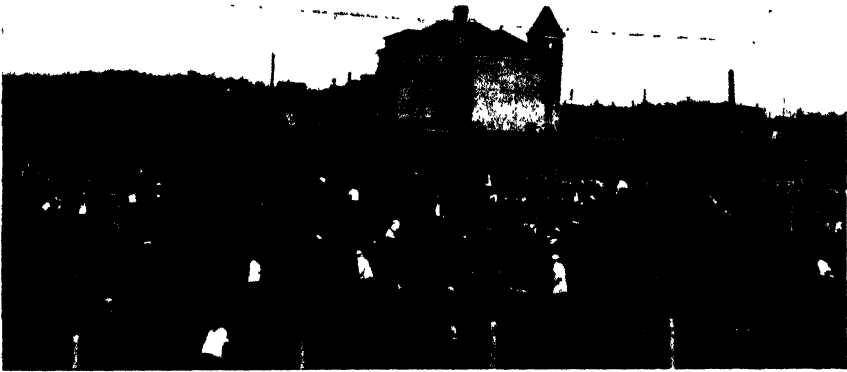
BY A. W. COCKS, B.Sc., DIRECTOR OF SCHOOL AGRICULTURE

IN the March number of THE AGRICULTURAL GAZETTE the Directors of School Agriculture for Saskatchewan reported that gardening in connection with schools was conducted in most cases on the school grounds and that gardening at home, under the supervision of the teacher, is seldom undertaken except when, for some reason, the school grounds are unsuitable.

EDUCATIONAL VALUE OF THE WORK

The officials of the Department in the past have always emphasised par-

teachers and pupils were urged to devote their garden to vegetables and other crops of food-producing values. An effort has been made recently to obtain, by means of a questionnaire, some idea of the number of schools with gardens, the number of children taking part, and other information of a similar nature. Answers have not yet been received from all the school districts in the province and practically no returns are on file at the Department from the cities or large towns. Possibly over 3,500 school district had schools in opera-



SCHOOL GARDEN, QU'APPELLE, SASK., IN MAY

ticularly the educational value of school gardening, but this year, owing to the need for greater production, the attention of teachers and pupils was specially directed to the economic value of the work. By means of articles in the Saskatchewan Rural Education Monthly, which is a bulletin published by the Department of Education and supplied free to all teachers in the province,

tion during the past summer, but replies have been received up to the present from only 1,550. The information thus obtained indicates that about 1,000 of these 1,500 districts have gardens on the school grounds, while in 225 cases home gardens have been organized by the Department. The number of pupils receiving instruction in gardening, either at home or at school, is re-

ported to be slightly over 17,500. It is estimated that were reports received from all school districts in the province the figures herein given would be almost doubled.

With regard to the distribution of the produce—this is a matter which has been left to the teacher and pupils themselves. The Department has simply suggested that care be taken of all food produce and has urged the

themselves at the beginning of the season to contribute \$1,000 to the Belgian Relief Fund by growing saleable vegetables. Other schools have devoted the whole of their gardens to the growing of potatoes for food or for seed.

SATISFACTORY PROGRESS REPORTED

The progress in school gardening



SCHOOL GARDEN, QU'APPELLE, IN JULY

canning of all surplus vegetables and fruits. Instructions respecting canning have been supplied to the teachers through the medium of the monthly bulletin. It is probable that most of the produce from school gardens has found its way to the home table, but in a few cases it has been sold to raise funds for patriotic purposes; for example, the schools of the Lost River municipality pledged

in the Province of Saskatchewan during the past three years has been very satisfactory, particularly when it is considered that the work is not supported at the present time by means of a Government grant. It is just possible that some more definite recognition by the Department of the value of school gardening would considerably increase the efficiency with which the work is carried on.

BRITISH COLUMBIA

AGRICULTURAL COURSE AT VICTORIA HIGH SCHOOL

BY J. W. GIBSON, M.A., DIRECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

A COURSE in the study of agriculture was commenced at the Victoria High School with the fall opening. The initial class includes upwards of 30 boys and girls. This new course is being inaugurated as a result of negotiations carried on last spring between the school boards of Victoria and Saanich and the Department of Education. It is a two-year course, and will occupy the time heretofore allotted to the study of one of the foreign languages, with which it is made optional. Whereas, it has been compulsory in the past for high school students to take up the study of two foreign languages, it now becomes permissible for them to omit one or both of these, and take the course in agriculture instead. The only condition is that students wishing to qualify for first-class teachers' certificates or wishing to enter the University must include with agriculture the study of one foreign language. In all the other regular high-school studies no difference is made for those taking the course in agriculture.

WHAT THE COURSE INCLUDES

The course itself covers all the

usual branches of agriculture and with some slight variation in the second year is the same for girls as for boys. It is the intention in the second year to stress certain phases of domestic science for girls and certain special topics in agriculture for boys. The work in agricultural science naturally associates closely with the regular high school science course, and will be conducted in accordance with the best modern methods, which combine experimental work in the field and laboratory with class-room instruction. For the present the out-door work in experimental agriculture will be conducted in the grounds used by the summer school students in agriculture, located close to the high school.

The agricultural course will be in charge of Mr. Horatio E. Hallwright, B.S.A., a graduate of Manitoba Agricultural College. During the summer of 1916 Mr. Hallwright was acting Horticulturist at the Dominion Experimental Farm at Brandon, Manitoba, and during the past summer was in charge of the tree planting work inaugurated by the Canadian Pacific Railway Company in Alberta and Saskatchewan.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

THE FOOD CONTROL COMMISSION

WHEN early in the past summer it became known that the food situation of the world was critical and that crops in many countries were wholly or partially failures, food controllers were appointed in Canada and the United States. The Honourable W. J. Hanna was selected by the Dominion Government. In connection with this step the collective food experience of the Dominion is being employed to solve the food problem and secure essential food supplies for Great Britain and the Allied armies and nations. The closest possible co-operation is being observed between the Food Controller's office, the Federal and Provincial Governments, and national and local organizations of a public character.

The basis of organization of the Food Controller's office provides for the creation of six departments to deal with various phases of the food problem.

There is a central Advisory Committee composed of representatives of the Government, the churches, labour organizations, educational departments and institutions, urban interests, farmers, rural municipalities, and men's and women's organizations. It is the province of this central body to advise the departments through the Food Controller.

Provincial machinery has been established through the creation of special provincial committees to advise upon plans prepared by the departments and approved by the Food Controller. Each provincial committee includes in its personnel representatives of the Government, of the churches, of the schools, of the farmers, of labour of urban and rural districts, and of men's and women's associations. In addition, special committees, representing producers, manufacturers, handlers and consumers of food products, have been appointed to investigate and formulate plans for action on individual problems dealt with by the departments. The first committees to be formed in this connection were the Food Consumption Control Committee and the Fish Committee.

THE VARIOUS DEPARTMENTS

The interior organizations of the Food Controller's office includes: Food Saving Department, Food Industries Department, Food Distribution Department, Information and Statistics Department, Business and Office Department, Educational Department.

The Food Saving Department deals with such problems as:—

- (a) Consumption in public eating places, etc.
- (b) Instruction in methods of conservation in private houses.
- (c) Instruction in preservation of perishable products.
- (d) Instruction in substitution of foods to take the place of those required for export.
- (e) Securing the co-operation of national, provincial and local organizations.

The Food Industries Department has charge of:—

- (a) Matters relating to flour, bread, meat, fish, dairy products, canned and all manufactured food.
- (b) Preparation of certain foods in order to encourage their use and to insure plentiful supplies.

The Food Distribution Department is divided into sections:—

- (a) To deal with purchase, prices, storage, transport and sale of food for home consumption and export problems.
- (b) To advise with British and foreign buyers.
- (c) To advise with handlers and shippers.

The Information and Statistics Department has sub-divisions to:—

- (a) To gather statistics from Government Departments and international sources, and tabulate them for the use of the other departments.
- (b) Ascertain the quantity, location, ownership and sources of food supplies for home consumption and for export.

The Business Department in charge of the Assistant Chief of Staff handles general office organization, accounting, finances, office supplies and the systematic filing of data and correspondence.

The Educational Department is responsible for the dissemination of general news for the information and instruction of the public and for the publication of educational and other matters supplied to it by other departments.

ACTS RELATING TO AGRICULTURE

DRAINAGE IN ALL ITS PHASES

It will be seen by the review that follows of the various Acts that have been passed by the provinces of the Dominion that very considerable attention has been bestowed upon drainage in all its phases. Although several of the measures are conducted and under the control of the provincial Departments of Public Works, yet they are so intimately connected with the cultivation of the land, and thus with agriculture, that they have been dealt with as if directly connected with the different Departments of Agriculture.

PRINCE EDWARD ISLAND

By the Drainage Act of Prince Edward Island, passed in 1916, upon a petition according to form of the majority of the resident and non-resident owners of the lands to be benefited, an engineer is to be appointed to make a report under oath of the necessity for the work, of the cost, of the extent of the lands that will be benefited and of any damage that may be caused. He is also required to assess the lands through which the drain will pass according to the value of the benefit likely to be derived. A copy of the report must be sent to the Commissioner of Agriculture and to any person indicated by the petitioners. For the purpose of meeting any objections that may be raised, the Commissioner must call a meeting of parties interested at which the engineer must be present with his report. The report having been adopted by vote any person objecting to his assessment has right of appeal to the County Judge. If the report be confirmed, the costs of the appeal must be paid by the appellant. If any change is made the other assessments must be altered to comply therewith. The engineer is to have sole charge of the work. If any owner neglects to maintain his portion of the drain any other owner whose lands are affected can notify the owner at fault and, if the necessary repairs are not made within ten days, can notify the engineer, who must take action. If any owner desires a loan for tile drainage purposes, he can apply to the Commissioner and his request can be complied with to the extent of \$14 per acre, repayment to be made within 20 years in equal annual instalments on December 1st in each year at a rate of interest to be set by the Lieutenant-Governor in Council, but not to exceed the rate paid by the province. Applications for loans must be accompanied by certificates of titles and by statements of encumbrances, if any. The charges take precedence over all dower and rights of dower. The Government can issue debentures to meet the expenses incurred under the Act and must set aside 2½ per cent of the money thus raised as a sinking fund to go towards the redemption of such debentures.

TILE DRAINAGE IN NOVA SCOTIA

The principal Act in force in the province of Nova Scotia in connection with drainage of farm lands is "The Tile, Stone and Timber Drainage Debenture Act," 1910, Chapter 11, amended in 1914, Chapter 53. There was also an Act to assist purchasing of ditching machines in 1912, Chapter 21, but this was repealed in 1917, and Chapter 11, "An Act to assist in the Purchase of Power Machines for Agricultural Purposes", substituted. This latter Act, as noted in the July number of THE GAZETTE, page 563, made provision for the Governor-in-Council making a grant on the recommendation of the Secretary for Agriculture to assist in the purchase of power ditching machines, clover hullers or like machines.

The "Tile, Stone and Timber Drainage Debenture Act, 1910," is cited as "The Tile Drainage Act". It authorizes municipal councils to pass by-laws for borrowing in sums of not less than \$100 and for the issuance of debentures payable within twenty years at 5 per cent interest per annum, for purposes of the Act. The entire amount of the indebtedness so incurred must not exceed \$10,000. Each debenture must bear a coupon calling for \$7.36 to meet the interest and to provide a sinking fund. The debentures must be made payable to the Provincial Treasurer. The Commissioner of Municipal Sinking Funds is required to report upon the advisability of investment in the project proposed in the by-law. Any owner of land wishing to borrow money for the purpose of tile, stone or timber drainage can make application to the council in set form. Debentures must not be issued in excess of 75 per cent of the estimated cost of the work. The province can invest in such debentures to the extent of \$50,000 in the aggregate. Municipal councils can lend the money raised in sums of not less than one hundred dollars and no more than \$1,000 to any one person. The money borrowed must not require the levying of a rate of more than three cents in the dollar upon the value of the land to be drained. Owners can secure discharge from their indebtedness by paying the treasurer of the municipality the amount due plus five per cent. Municipal

councils borrowing money in this way must make a return to the Provincial Secretary each year on or before the 30th of January, giving full particulars of the work done and stating the names of the borrowers, the property upon which the money has been borrowed, and the names of persons whose application has been refused and the reason for the refusal. The councils may appoint inspectors. If municipalities fail to make their payments within a month of their being due, the rate of interest is raised to 7 per cent and can be levied on the whole ratable property within their boundaries. If any officer pays out money contrary to the provisions of the Act he becomes personally responsible and liable to a penalty of \$500, to be recovered with costs by any person who sues for the same. Any warden or councillor wilfully omitting to see that the provisions of the Act are lived up to also becomes personally responsible.

DITCHES AND WATERCOURSES IN NOVA SCOTIA

The Ditches and Water Courses Act of Nova Scotia requires the council of every municipality to appoint an engineer to carry out the provisions of the Act. Unless otherwise ordered by the engineer every owner is required to open and make, deepen or widen, a fair proportion of the ditch or drain to the construction of which he may become a party. If an owner fails to keep his section in proper repair any other interested owner can notify him and he must act upon such notification within 30 days, failing which the engineer must investigate, and, if the complaint is well founded, can have the work done and all the costs assessed to the owner at fault. If the owners cannot agree to the arrangements appeal can be made to the council, and, if the work required passes through the land of more than five owners the council may instruct the engineer to proceed with the work and assess the costs proportionately. No land can be assessed that lies more than fifty rods above the commencement of the ditch or drain or more than fifty rods on either side. The land is to be assessed according to the value of the benefit derived. If the drain or ditch should pass through land that is not in any way advantaged then that land is not to be assessed, but the work can be carried on at the expense of those persons interested. Owners dissatisfied with the award have the right of appeal to the County Court. The Treasurer of the municipality is authorized to pay the contractor for any work ordered to be done and to collect the same from the objecting or neglecting owners by the same process as for arrears of taxes. The engineer is

responsible for the proper carrying out of the work and can give consent to have the ditch or drain covered through the portion of land of any owner requiring it. Extension of the drain can be secured by common consent or by an appeal under the Act. Drains can be carried from one municipality to another on the certificate of the engineer and the municipality of the second part is to collect any arrears in the same manner as the municipality of the first part is authorized under the Act to do. If the council fails to fix the engineer's fees then the engineer can charge and collect his legally authorized fees for such work.

NEW BRUNSWICK'S RECENT ACT

"An Act to Facilitate the Drainage of Farm Lands", was passed by the legislature of New Brunswick at its recent session. The Act is briefly described under the head of "Recent Agricultural Legislation" in the August number of THE GAZETTE.

UNDER THE MUNICIPAL CODE IN QUEBEC

Quebec has passed no farm drainage Act, but special provisions are made in the Municipal Code regarding water-courses, every one of which, with the exception of road and boundary ditches that drain only the two properties between which they are situated, is governed according to Chapter III of the Code. Every non-navigable stream is regarded as a municipal water-course. Work can either be done according to a deed of agreement among the parties interested or the proprietors of the lands drained. Water-courses must be kept in flowing order from May 1st to October 31st. The municipal inspector is responsible for this being done and must assess the cost of any labour required in removing obstacles or repairs against the parties interested. Any person who obstructs a watercourse or permits an obstruction to remain two days from the receipt of a written or verbal notice given by a person interested, incurs a fine of not more than one dollar for every day the obstruction remains. The owner of low or swampy land may make a watercourse through a neighbour's land in accordance with a by-law, by *proces-verbal* or by deed of agreement. The municipal inspector can authorize the opening of any trench or excavation in any public road to allow a water-course to pass through the same and proprietors or occupants whose land is drained by a water-course can be made liable for all costs of the work under a *proces-verbal* or by by-law.

NOTE—The Acts relating to drainage in other provinces will be reviewed in a subsequent issue of THE AGRICULTURAL GAZETTE.

ORGANIZATION FOR MARKETING FRUIT AND VEGETABLES

BY FRED H. GRINDLEY, SECRETARY FRUIT AND VEGETABLE COMMITTEE, OFFICE OF THE FOOD CONTROLLER

AS a temporary arrangement I am devoting a portion of my time to the work of the Food Controller's office as Secretary of the Fruit and Vegetable Committee of which Mr. D. Johnson, Fruit Commissioner; Mr. C. W. Baxter, Chief Fruit Inspector, and Mr. Geo. McIntosh, in charge of Transportation in the Fruit Branch, are members in an advisory capacity. As a result of several sessions of this committee, which consists of representatives from all the fruit-growing provinces, the following facts relative to the apple situation were ascertained:—

1. That a considerable portion of the crop in British Columbia had already been contracted for.

2. That the Ontario crop was very light and scattered, and,

- 3 That Nova Scotia had a yield above normal.

For these reasons it was considered unwise to set a price to the producer. Several meetings were held in Nova Scotia early in September, and at that time there was some belief that the British embargo would yet be modified to permit the export of a certain portion of the crop. Since then, however, a definite statement has been made by the British Government that the embargo will remain in effect. The situation in Nova Scotia at present is that practically the entire crop is out of the hands of the growers, and prices have been inflated considerably by dealers. The Food Controller is considering steps to be taken to stop speculation, and to prevent undue profits being exacted between the producer and consumer.

An Order in Council has been passed compelling every wholesaler handling apples to register with this office. It is believed that this will help to prevent undue speculation. Accurate records will be kept through the filing of statements from these dealers of their purchases and sales, prices, etc., and in this way it will be possible to keep a close record of their gross profits.

The potato situation has also been taken up. Representatives of the five Eastern

provinces were in session here during the week of October 8th, and have recommended, in view of the large surplus, and competition resulting therefrom, not to fix the price of potatoes to the producer. The same system of registration which has been outlined above in the case of apples, will be applied to potatoes. Further than that, reports are being published from the Food Controller's office, twice weekly through the Canadian press, giving the price which growers are receiving for potatoes, and also the wholesale market prices in the leading Canadian cities east of and including Toronto. These give the consumer an idea as to what he should pay for his stock and in a measure assist in the prevention of undue profits.

In Western Canada, the situation is in the hands of Mr. F. M. Black, Chairman of the committee, who is making a close investigation into conditions there.

One of the first steps taken by the committee on its formation, was the organizing of a sub-committee in each of the provinces, with a direct representative on each, so that in the event of provincial problems arising out of the work of the parent committee, these could be immediately placed in the hands of the provincial committee, who could deal with them at close range.

In order to facilitate the movement of the Nova Scotian apple crop, Mr. H. H. Schaefer, who has spent many years in railway work, has been appointed to take charge of transportation work under this committee, with headquarters at Kentville, N.S. Working in co-operation with Mr. Schaefer are Mr. Geo. McIntosh of the Fruit Branch at Ottawa, and Mr. Geo. Spencer, Chief Operating Officer of the Railway Commission. These men will supervise loading, proper distribution and adequate supply of cars, and will endeavour to secure the marketing of the crop with a minimum risk and loss through frost injury or overheating. The co-operation of all the railways who have to do with the movement of the Nova Scotian crop has also been promised.

FARM LOANS IN THE UNITED STATES

IN August, 1916, there came into operation in the United States the Federal Farm Loan Act. At the end of one year, the Act had been put into force in every state and loans to farmers were being approved at the rate of nearly one million

dollars a day. Farm loan associations were being chartered at the rate of about twenty-five daily. At the end of the first year the loans applied for exceeded \$100,000,000. During the last two and a half months of the first year, more than eight hundred

farm loan associations had been chartered. The greater part of the first year was consumed with the tasks of dividing the country into twelve federal land bank districts according to the farm loan needs of the various sections; the locating of the federal land banks; the sale of the capital stock of the banks; the selection of bank directors and officers; the selection of federal land bank appraisers, and the establishment of a flat interest rate of 5 per cent on farm mortgages in all parts of the United States. The average number of farmer borrowers in each association chartered is eighteen and the loans average about \$2,300 in size.

After farm loan associations are chartered it is necessary for the lands of their members to be appraised and abstracts of title provided. More than two hundred federal farm loan appraisers are in the field placing valuations on the lands as rapidly as they can get to them. Approximately \$5,000,000 of loans were closed during the first year and the money actually delivered to the farmers.

Under the Act farmers are permitted to borrow for the purpose of land purchase; re-funding existing indebtedness; live stock purchase; clearing and draining land; construction of improvements and the purchase of fertilizer and any equipment necessary in the cultivation of the land. The loans are limited to 50 per cent of the appraised value of the land, plus 20 per

cent of the appraised value of the permanent insured improvements.

All mortgages under this Act are made on the amortization plan, and run generally for thirty-six years. The farmers make annual payments equal to 6 per cent, five per cent paying interest and 1 per cent being applied on the principal. The 1 per cent applied on the principal annually wipes it out at the end of thirty-six years. The borrower has the right to pay all or any part of the mortgage after it has run five years.

Farmers and prospective farmers may borrow. Land leased to tenants cannot be mortgaged under this act. This cheap capital cannot be used for land speculation and land monopoly, because loans are limited to \$10,000 each. This great volume of capital which is being loaned to farmers is procured by the sale of bonds to investors. As banks lend money and take farm mortgages in return they issue bonds against the mortgages and sell the bonds to investors. These bonds bear 4½ per cent and are free of all taxation, being declared by the law "instrumentalities of the government." The bonds of any one federal land bank are endorsed by all of the banks, and consequently all bonds issued have behind them the resources of all of the twelve federal land banks and all of the mortgages representing land appraised at twice the amount of the obligation against it.

NATIONAL SERVICE LEAGUES IN NOVA SCOTIA.

IN the August number of THE AGRICULTURAL GAZETTE there appeared an account of the work of the Ontario Organization of Resources Committee in aiding the conservation, utilization, and organization of the resources of Ontario for the successful prosecution of the war, and the increase and maintenance of agricultural production during the war and thereafter. In Nova Scotia effort along similar lines has been undertaken through the medium of National Service Leagues inaugurated by the Director of National Service, Mr. G. S. Campbell. A report on the work of these organizations says:

It was decided to form National Service Leagues in each of the provincial towns. The method was to address the Mayor, and place the responsibility of arranging the meeting in his hands. In addition to that letters were frequently addressed to important people of the towns, asking for their co-operation and assistance. The constitution of these leagues is as simple as possible—a local

committee representing all classes of the community with power to add to its number—was previously selected and appointed at the meeting. That committee then appointed its own chairman and secretary, to whom literature, etc., were sent. At each meeting, the necessity for acting on its initiative and taking supervision of all local patriotic work was impressed upon the league. While the success of these leagues depends very largely on the personnel of the committees, they have been the means of stimulating patriotic effort in many directions throughout the province. For example, the Halifax league in order to help out small farmers of limited means, bought a considerable quantity of fertilizer and distributed it to the farmers, with the understanding that they were to be repaid either in cash or produce at a stipulated minimum rate. This has not only enabled a number of the farmers to increase their acreage of production, but it has created a feeling of sym-

pathy between the city and the country, which is most desirable. These leagues have also encouraged the cultivation of town lots, and as a result, the gardens and suburban fields have been converted into vegetable plots on a scale never before attempted. In some cases the leagues have organized campaign for the patriotic fund, with the best possible results. Such leagues have been established in Halifax, Amherst, Annapolis Royal, Antigonish, Bridgetown, Bridgewater, Digby, Glace Bay, Inverness, Liverpool, Lockport, Lunenburg, New Glasgow, North Sydney, Pictou, Port Hawkesbury, Port Hood, Shelburne, Shubenacadie, Stellarton, Stewiacke, Sydney, Sydney Mines, Trenton, Truro, Waymouth and Yarmouth. In addition to these, production clubs have been formed by citizens in Dartmouth, Hantsport, Windsor, Wolfville, Kertville and Middleton. There are a few other

towns in which National Service Leagues will soon be formed.

Numerous farmers' meetings were held throughout the province, at which farmers were urged to increase production. The local Government has materially helped in this movement by supplying seed, fertilizer, agricultural implements, etc., where these were absolutely necessary. The Halifax Board of Trade has co-operated by giving a number of prizes for the best cultivated small farms in various sections of the province. As a further encouragement a diploma of honour will be given to those farmers who have been especially successful in increasing their output of essential crops. The military authorities have heartily co-operated and have always been willing, when military requirements permitted, to give men temporary leave of absence to work on their farms.

UNITED STATES LIVE STOCK INDUSTRIES COMMISSION

THE United State Department of Agriculture has organized a live stock industries commission. The Government's aims include the following:

"To save a breeding stock of food animals for the future to meet extraordinary demands of the world after the war.

"To adjust present stock-growing conditions to supply to best advantage the meat demands of soldiers and citizens of the United States and soldiers and citizens of America's allies.

"To prepare for demands of other nations for breeding stock now and hereafter.

"To supply the continuing necessity for meat and dairy animals to convert forage and grains not needed for human consumption into meats and dairy products.

"To arrange a redistribution of herds along most productive and economic lines."

An executive committee has been added to the general Live Stock Industries Committee and on this have been appointed Gifford Pinchot of the Food Administration, George M. Rommel and B. H. Rawl of the Department of Agriculture and E. C. Lassater of the Food Administration. Mr. Hoover and Secretary Houston have called upon the state agricultural and food institutions and state councils of defence to co-operate.

It is the business of the committee to further a plan for the transfer of thousands of head of cattle, sheep and hogs from the big western producing districts to small farms in central and southern states. Order for stock can be placed with county agents of the Agricultural Department.

ASSOCIATIONS AND SOCIETIES

THE INTERNATIONAL SOIL-PRODUCTS EXPOSITION

The Twelfth annual congress of The International Soil Products Exposition was held at Peoria, Illinois, on September 18th to 29th. In connection with the congress, the Soil-Products Exposition was held in which Canadian exhibitors won a large number of awards.

At the conclusion of the convention, the executive committee expressed its convictions and desires in the field of agricultural thought.

"We deem it our first duty and privilege to align ourselves squarely with the President, his administration, the army and navy; we pledge the richness of our fields, the wealth of our flocks and, as need comes, the support of our firesides. America must go unafraid, leading, sustaining and binding up wounds as the nations advance into the clear sunlight of democracy and freedom to every man.

"In view of the aggressive action this congress had taken to further rural credit and good road legislation, we are glad to recognize the service such enactments have given our people and look forward to the very great development they may effect.

"The congress is pleased to have the association and interchange of ideas with representatives of the various foreign nations represented at the congress and invite their participation in future years.

"As a congress we are gratified to note the comprehensive character of the Soil-Products Exposition and the splendid exhibits at this greatest agricultural show in the United States. We wish in this manner to express our sincere appreciation to the exhibitors and invite their return with such admirable exhibits or better, next year.

"We wish to renew our allegiance to the principles of crop rotation, the preservation and replenishing of soil fertility by the use of live stock and the principles, which this congress was organized to promote and which have become clearly understood and well established since that time. We will not longer mine the soil but build it into that productive state which will make it a great heritage to our posterity.

"Every movement to further dignify farm labour meets with our approval and we feel that in the extension work among the farmers and housewives, boys and girls, is found one of the most fertile soils and one of the most effective systems at this time. The extension work as carried on by joint effort is most valuable and we would heartily urge its further extension and if it be practical, a more liberal application of rules so as to give it greater opportunity for service.

"During the past season in our grain growing states, the efforts of the Department of Labour secured farm help, which without such effort, would have resulted in very great loss to our farmers. We appreciate this very valuable assistance and wish to encourage the Department in its free employment work and to urge upon Congress an appropriation which will give opportunity for an effective organization of distribution in each state where it is desired. As there is a prospect of increasing shortages of this necessary help, we consider this matter of very great importance.

"Again we wish to advocate the further establishment of consolidated rural schools and the joining together of the rural population and the community interests about the country school and the country church and an increase in the comfort of the farm homes, and the education and inspiration of the farm people. The supreme effort in farm life should be devoted to the rearing of better boys and girls; of those who are imbued with love for the farm home and the soil as associated with the development of the habits of life with spiritual and intellectual growth and patriotism. As one means of this we would recommend the encouragement of agricultural fairs and expositions for their educational influence."

The election of officers resulted as follows: President, Geo. Albert Smith, Salt Lake, Utah; First Vice-President, Frank G. Odell, Omaha, Nebraska; second Vice-president, T. J. Harrison, Winnipeg, Man.; third Vice-President, H. M. Bainer, Topeka, Kansas; Chairman, Board of Governors, W. I. Drummond, Enid, Oklahoma; Secretary, F. J. Wilmarth, Enid, Oklahoma.

PRIZES WON BY CANADIAN EXHIBITORS

Following is a full list of prizes won by exhibitors from Canada:

Best Display of Vegetables by a Nation	Saskatchewan	Third
Best Exhibit by an Individual Farmer	Samuel Larcombe, Birtle, Man	Third
Hard Red Spring Wheat	Samuel Larcombe	First
Hard Red Spring Wheat	A. Cooper, Treesbank, Man	Second
Hard Red Spring Wheat	W. J. Corrothers, Methven, Man	Third
Sweepstakes on wheat	Samuel Larcombe	
White Oats	M. F. Mountain, Solsgirth, Man	First

White Oats.....	John W. Lucas, Cayley, Alta.	Third
Sweepstakes on Oats	M. P. Mountain	
Two-rowed Barley	Chas. D. Pope, Swan Lake, Man.	First
Two-rowed Barley	John W. Lucas	Third
Rye	John Stochaw, Beulah, Man	First
Rye	D. C. Ferguson, Winnipeg	Third
Sweepstakes on Rye	John Stochaw	
Field Peas	Seager Wheeler, Rosthern, Sask.	First
Field Peas	Wm. S. Simpson, Vanguard, Sask	Second
Field Peas	John W. Lucas	Third
Sheaf Brome Grass	Seager Wheeler	First
Sheaf Timothy	Bond Brothers, Fenton, Sask	Second
Sheaf Hungarian Millet	R. T. Trischman, Whitemouth, Man	Second
Sheaf Western Rye Grass	Seager Wheeler	First
Brome Grass Seed	Seager Wheeler	Second
Brome Grass Seed	Wm. S. Simpson, Vanguard, Sask	Third
Flax Seed	J. H. Pritchard, Roland, Man.	First
Flax Seed	David Pritchard, Roland, Man	Second
Flax Seed	W. C. Simpson, Pambrum, Sask	Third
Western Rye Grass Seed	Seager Wheeler	First
Western Rye Grass Seed	Wm. C. Simpson	Second
Sheaf Hard Red Spring Wheat	Seager Wheeler	First
Sheaf Hard Red Spring Wheat	J. W. Broatch, Moose Jaw, Sask	Second
Sheaf Hard Red Spring Wheat	Andrew Tart, Semans, Sask	Third
Sheaf Oats, any recognized variety	Seager Wheeler	Second
Sheaf Oats, any recognized variety	Samuel Larcombe	Third
Sheaf Two-rowed Barley	Seager Wheeler	First
Sheaf Flax	W. S. Simpson	Third
Sheaf Field Peas	Seager Wheeler	Second
Russett Burbank Potatoes	Aldis W. Cameron, Saskatoon, Sask	First
Russett Burbank Potatoes	Samuel Larcombe	Second
Gold Coin Potatoes	Aldis W. Cameron	Third
Carmen Potatoes	Aldis W. Cameron	Third
Irish Cobbler Potatoes	Seager Wheeler	First
Early Ohio Potatoes	Seager Wheeler	First
Sweepstakes on Potatoes	Seager Wheeler	
Yellow Onions	H. C. Whillians, East Kildonan, Man	Second
Table Beets	Samuel Larcombe	First
Yellow Mangel Wurzel	H. C. Whillians	First
Tomatoes	H. C. Whillians	Third
Cabbage	E. Guest, Indian Head, Sask	First
Carrots	E. Guest	First
Cauliflower	H. C. Whillians	First
Cucumbers	E. Guest	Second
Sugar Beets	H. C. Whillians	First
Garlic	H. C. Whillians	First
Crab Apples	A. R. Stevenson, Morden, Man	Third

DRY-FARM SECTION

Dry Farmed Hard Red Spring Wheat	Jas. S. Fields, Regina, Sask	First
Dry-Farmed Hard Red Spring Wheat	Samuel Larcombe	Second
Dry-Farmed Hard Red Spring Wheat	Robt. W. Clark, Speers, Sask	Third
Sweepstakes Dry-Farmed Wheat	Jas. S. Fields	
Oats	Wm. S. Simpson	First
Oats	John W. Lucas	Second
Oats	W. C. Simpson	Third
Barley	Chas. D. Pope, Swan Lake, Man	First
Barley	Jas. S. Fields	Second
Barley	Wm. S. Simpson	Third
Rye	John W. Lucas	First
Brome Grass Seed	John W. Lucas	First
Brome Grass Seed	Seager Wheeler	Third
Potatoes	Seager Wheeler	First
Potatoes	W. H. Tomalin, Regina, Sask	Second

HAMILTON HORTICULTURAL SOCIETY—PROTECTION OF BIRDS

The Horticultural Society of Hamilton, Ontario, has taken a keen interest in the matter of having the law respecting the preservation of bird life carried out. Whenever the law has been known to be broken in the shooting of robins and other song birds, the attention of the proper officials in the city has been drawn to the matter

with the result that a large number of arrests have been made, fines imposed and guns confiscated. Commencing early in the season with a fine of five dollars, the magistrate has recently raised the fine to twenty dollars and confiscation of the firearms possessed by the law breaker.

THE WESTERN CANADA IRRIGATION ASSOCIATION

At the eleventh annual convention of the Western Canada Irrigation Association held at Maple Creek, Saskatchewan, the following officers were elected: President, T. D. Pattullo, Victoria, B.C.; first vice-president, Hon. Hewitt Bostock, Ducks, B.C.; second vice-president, C. R. Mernock, president of the Board of Trade, Lethbridge; acting secretary, J. C. Stead, Calgary; executive committee: chairman, F. H. Auld, Regina, Sask.; R. G. Williamson, Maple Creek, Sask.; Jas. L. Brown, Kamloops, B.C.; Jas. Johnstone, Nelson, B.C.; F. H. Peters, Calgary; A. S. Dawson, Calgary; W. E. Scott, Victoria, B.C.; and F. E. R. Wollaston, Vernon, B.C.

The convention was addressed by repre-

sentatives of the Departments of Agriculture of Saskatchewan, Alberta and British Columbia, the Dominion Departments of Agriculture and Interior, on such topics as the growing of farm crops by irrigation.

Among the resolutions passed were those recommending the reforestation of the Cypress Hills forest reserve for the purpose of regulating the stream flow in the territory affected; the uninterrupted gauging of streams of water supply; the prevention of pollution of waters in irrigation ditches and the indorsement of the principle of inter-provincial co-operation between western provinces in the consumption of home products.

THE WESTERN CANADA LIVE STOCK UNION

The fifth annual convention of the Western Canada Live Stock Union will be held at Regina, Nov. 14th and 15th. Each organization affiliated with the Union is entitled to one representative, in addition to its secretary. The Western provincial ministers of agriculture, deputy ministers of agriculture and live stock commissioners are among the directors of the Union, as are also the representatives having charge of agricultural and live stock development in Western Canada for the three cross-country railways. In addition to the breeding and other agricultural organizations that were previously members, the United Wool Growers' Association and the Alberta Agricultural Fairs' Association have affiliated with the Union.

His Honour, Lieut. Governor Lake and Premier Martin of the Province of Sas-

katchewan have accepted invitations to be present at the meeting. Invitations to be present have also been extended to the Dominion Minister of Agriculture, the Hon. John Oliver, Hon. Duncan Marshall, Hon. W. R. Metherell, Hon. Valentine Wirkler, Ministers of Agriculture respectively for British Columbia, Alberta, Saskatchewan and Manitoba; Mr. H. S. Arkell, Acting Dominion Live Stock Commissioner; Dr. F. Torrance, Veterinary Director General for Canada; Mr. Dan Johnson, Dominion Live Stock Representative, Winnipeg; Dr. S. F. Tolmie, Victoria, and Mr. W. A. Wilson, Secretary, Saskatchewan Live Stock Commission. Mr. E. L. Richardson, Calgary, is secretary of the Union and Dr. J. G. Rutherford is president.

NEW BRUNSWICK AGRICULTURAL SOCIETIES UNITED

The annual meeting of the New Brunswick Agricultural Societies United will be held in St. John, November 22nd. This association will purchase co-operatively

from seventy-five thousand to one hundred thousand dollars' worth of fertilizing materials for next season's crops. The Secretary is Stanley Wilson, Woodstock, N.B.

POMOLOGICAL AND FRUIT GROWING SOCIETY OF QUEBEC

The annual meeting of the Pomological and Fruit Growing Society of Quebec, will be held at Macdonald College on December 4th and 5th. The speakers will include representatives of the Departments of Agriculture of Nova Scotia, New

Brunswick, Quebec and Macdonald College. A fruit show will be held in connection with the meeting. The secretary of the society is Peter Reid, Chateauguay Basin, Quebec.

THE ENTOMOLOGICAL SOCIETY OF CANADA

The annual meeting of the Entomological Society of Ontario will be held at Macdonald College, Sainte Anne de Bellevue, Que., on November the 8th and 9th. The

secretary of the association is Mr. A. W. Baker, Ontario Agricultural College, Guelph, Ontario.

THE ONTARIO PROVINCIAL WINTER FAIR

The Ontario Provincial Winter Fair will be held as usual this year at Guelph. The date will be November 30th to December 6th. The Fair will comprise horses, beef cattle, dairy cattle, including the milking test; sheep; swine; poultry; eggs and seed. A number of new features have been introduced in the prize list this year. Among these might be mentioned the Ontario Horse Breeders' Special, a first prize of \$6 and a second of \$4, to be awarded to the Ontario breeders of winning animals in every horse class; an addition to class 25, grades and crosses of any breed of beef cattle, of \$70 divided into four prizes for heifers, barren, 3 year olds, and an increase of the prizes in the other sections in lieu of the money formerly given

to junior and senior yearling heifers and calf heifers; the addition of lustre to the fleece wool (domestic) class and an increase of the money given as premiums from \$60 divided into 15 prizes to \$144 divided into 32 or 8 prizes for each section; the addition of class 90 for pair of bacon hogs, open to farmers' sons taking part in the feeding-hogs-for-profit competitions, \$70 divided into 6 prizes; the extension of class 349, eggs fresh gathered, to include No. 1 pullets in half dozen and dozen lots, and an entirely new egg-laying contest for \$87 divided into 10 prizes, the rules for which are given in the prize list and which provide that the eggs must be laid during the six days of the fair commencing Friday, Nov. 30, and ending Wednesday, Dec. 5.

ONTARIO DAIRY CONVENTIONS

The Dairymen's Associations of Eastern and Western Ontario will hold their annual conventions, respectively, at Perth on January 10th to 11th, and at Stratford on January 16th to 17th. There will be held at each convention the winter dairy exhibition of cheese and butter. At the Eastern convention the exhibition will consist of cheese made from September 5th to September 30th; cheese made from October 16th to 31st; flat and Stilton cheese made from September 15th to 30th; creamery butter made from November 1st to 15th and dairy butter made within the same period. In each of the cheese classes substantial money prizes will be divided according to the scores made and awarded to the exhibitors whose cheese scores 95 points and upwards. In the creamery

butter class the same method of distribution of prizes will be made to the exhibitors scoring 94 points and upwards. In the dairy butter section, first, second, third and fourth prizes will be awarded without respect to the points won. All the exhibits become the property of the Association. At the conclusion of the show these will be sold by public auction and the money paid to the exhibitors. The secretary of the association is Mr. T. A. Thompson, Almonte, Ont. The prize list for the Western exhibition is practically the same, with the exception that no dairy butter is provided for at Stratford. A large number of specials are provided in each class. The secretary of the Western Ontario Dairymen's Association is Mr. Frank Hearn, London, Ont.

WOMEN'S INSTITUTES OF ONTARIO

Conventions of the Women's Institutes of Ontario will be held at Ottawa, November 7 and 8; London, November 14 and 15, and Toronto, November 21, 22 and 23. In addition to the presentation and dis-

cussion of district reports and other internal business, the subjects of "Patriotic Work," "War Service," "Food Conservation" will be dealt with in addresses and discussions.

SASKATCHEWAN LIVE STOCK ASSOCIATION

AUCTION SALES OF CATTLE, SHEEP AND SWINE

The seventh annual sheep and swine sales under the auspices of the Saskatchewan Live Stock Association will be held in connection with the winter fairs in Regina and Saskatoon on November 30th and December 6th respectively. Besides the sheep and swine sales, there will also

be an auction of pure-bred and grade female cattle under the auspices of the Cattle Breeders' Association. This fall sale is for females only and the bull sale will be held as usual in March next year. All cows four years old and over must have produced a calf or calved in 1916 or 1917 to be eligible for entry, and no cows over eight years old will be accepted.

ONTARIO BEE-KEEPERS' ASSOCIATION

The annual convention of the Ontario Bee-keepers' Association will be held at Hotel Carls-Rite, Toronto, on December

11th, 12th and 13th. The secretary of the association is Mr. Morley Pettit, St. George, Ontario.

DISTRICT CONVENTIONS OF THE SASKATCHEWAN GRAIN GROWERS ASSOCIATION

At a meeting of the executive of the Saskatchewan Grain Growers' Association the following schedule was arranged for district meetings:

District.	Place held.	First Day.
No. 3.	Estevan. . . .	Nov. 7th.
No. 2	Viceroy	Nov. 6th.
No. 15	Shaunavon.	Nov. 8th.
No. 14..	Swift Current..	Nov. 13th.
No. 7.	Balcarres ..	Nov. 15th.
No. 4	Regina. . . .	Nov. 20th.

No. 1	Moose Jaw	Nov. 27th.
No. 9	Yorkton	Nov. 30th.
No. 16	Rosetown	Dec. 4th.
No. 11	North Battleford	Dec. 4th.
No. 10	Humboldt.	Dec. 6th.
No. 6.	Saskatoon .	Dec. 11th.
No. 12	Prince Albert.	Dec. 13th.
No. 13	Unity .	Dec. 18th.
No. 8	Regina.	Dec. 19th.
No. 5	Wolseley.	Dec. 19th.

Many of these meetings will also hold over during the following day.

SASKATCHEWAN SWINE BREEDERS' ASSOCIATION

At the Saskatchewan Winter Fair to be held at Regina on November 27th to 30th there will be a swine feeding competition for boys and girls between the ages of ten and fifteen years, residents of the province. Each competitor is required to exhibit one pig, pure bred or grade, between the ages of five and eight months that was fed and cared for by the exhibitor for at least three months immediately previous to the opening of the fair. The exhibits will be judged from a butcher's standpoint. The Sas-

katchewan Swine Breeders' Association will pay the transportation charge of individual exhibits from the exhibitor's station to Regina, and will, in the absence of the exhibitor, provide free feed and attendance and will exhibit the entry. Fifteen prizes are provided, ranging from \$4 to \$30. The secretary of the Swine Breeders' Association is Mr. P. P. Bredt, Acting Live Stock Commissioner, Department of Agriculture, Regina.

THE SASKATCHEWAN WINTER FAIR

The Saskatchewan Winter Fair will be held at Regina on November 27th to 30th.

The secretary is Mr. D. F. Elderkin.

THE ALBERTA WINTER FAIR

The Alberta Winter Fair will be held at Calgary on December 11th to 14th. During the fair, the live stock associations of the

province will hold auction sales of pure bred and grade beef cattle and horses. The secretary is Mr. E. L. Richardson.

THE UNITED FARMERS OF ALBERTA

The 10th annual convention of the United Farmers of Alberta will be held in Calgary on January 22nd to 25th, 1918.

The secretary is Mr. P. P. Woodbridge, Calgary.

BABY BEEF COMPETITION FOR BOYS AND GIRLS AT THE ALBERTA WINTER FAIR

DECEMBER 11 to 14 are the dates set for holding the Alberta Winter Fair at Calgary this year. Upwards of \$1700.00 in cash and trophies will be distributed in prizes. Features of the fair are auction sales of pure-bred and grade beef females and of pure-bred and grade horses, and also a baby beef competition for boys and girls over nine years of age and under seventeen and for pure-bred or grade steers or heifers calved in 1916. Entries for the sales close November 12th and for the fair December 1st.

and gold medal, the second, \$80 and silver medal; the third, \$60; fourth, \$50; fifth, \$45; sixth, \$40; seventh, eighth and ninth, each \$35, and tenth, \$25. Class L is for heifers calved in 1916, the prizes being the same as in Class K. An extra purse of \$200 will be added in prizes to class K or L, whichever has the largest number of entries. To each prize in the class ten dollars is to be added and an eleventh, twelfth, thirteenth and fourteenth prize of \$25 each created Class M is the sweepstakes class for the best steer or heifer shown in the competition, the prize being a challenge shield valued at \$250 to be held by the winner one year. An illustration of the shield is herewith given.



GRAND CHALLENGE SHIELD
Baby Beef Competition, Calgary Winter Fair, 1917

BABY BEEF COMPETITION CLASSES

The baby beef competition has been divided into nine classes. Class A is for animals entered by girls; B for animals bred in Alberta and sired by registered Aberdeen Angus bulls; C is for animals sired by registered Aberdeen Angus bulls; D is for animals bred in Alberta sired by registered Hereford bulls; E is for animals sired by registered Hereford bulls; F is for animals bred in Alberta and sired by registered Shorthorn bulls; G is for animals sired by registered Shorthorn bulls; K is for steers calved in 1916, the first prize being \$100

RULES OF THE COMPETITION

The rules for the baby beef competition are as follows:

(1) Open to boys or girls, residents of Canada, over nine years and under seventeen years of age, and for pure bred or grade steers or heifers calved in 1916.

(2) Competitor must have fed, cared for and fitted his entry between Nov. 1st, 1917, and the date of the fair, and must personally exhibit the animal in the show ring when judged or paraded. It is expected this competition will be held at each succeeding Alberta Winter Fair, when longer notice can be given and the exhibitor will be required to feed his entry at least 4 months.

(3) One or more entries may be made from one family or farm by different boys or girls eligible but only one entry may be made in each class by the same person.

(4) In making entry, the name, address and date of birth of competitor must be furnished, the age of the animal, date of birth, name and number of sire and breed if known.

(5) Parents, guardians or employees must certify that the applicant is eligible as to age and has complied with the conditions of the competition. No entry will be accepted unless this certificate accompanies it.

(6) The Alberta Winter Fair Committee reserve the right to decide any point not covered by the rules.

ALBERTA DAIRY CONVENTION

The Provincial Dairy Convention for Alberta will be held at Edmonton on January 22nd and 23rd, 1918. The secretary

is Mr. C. Marker, Calgary, Dairy Commissioner for Alberta.

BRITISH COLUMBIA VETERINARY ASSOCIATION

The tenth annual meeting of the British Columbia Veterinary Association was held at Penticton on Sept. 21st and 22nd. A number of interesting and instructive papers were read, one on "The Hygienic Value of Goat's Milk" attracting special attention from the prophecy that some day the milk of the goat would displace that of the cow. Resolutions were passed advocating the more thorough inspection of cows and dairies, especially in unorganized districts, stricter application of the tuber-

culin test and the establishment of communal slaughter houses. Drs. Thomson, Acres, Jarvis and Tolmie were appointed a committee to draw up suggested regulations for municipal or communal slaughter houses. The old officers were re-elected as follows: President, Dr. S. F. Tolmie; vice-president, Dr. George Howell; members of council, Drs. J. G. Jervis, W. H. Pickering, W. W. Alton and H. H. George; secretary-treasurer and registrar, Dr. K. Chester.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS

Seasonable Hints, No. 9, for November. This periodical of sixteen pages, published once in four months, contains seasonable hints to farmers under the headings of live stock, mixed farming and feeds, field crops, horticulture, poultry, bees, tobacco, botany, field root seeds, cleaning grain for seed and cereals.

THE DIVISION OF ANIMAL HUSBANDRY

Finishing Lambs for the Block, Pamphlet 16. The author Mr. E. S. Archibald, Dominion Animal Husbandman, shows the profits that have been made on the winter finishing of lambs during seven years' experiments. He also gives the rations found most suitable and the equipment necessary for winter feeding.

THE HEALTH OF ANIMALS BRANCH

The report of the Veterinary Director General for the year ending March 31, 1916, is issued. This report covers the work of the branch in its two divisions: (1) For the protection of the health of live stock of Canada, and (2) The work of the Meat and Canned Foods Division.

Bulletin No. 23, *Anthrax*, by Chas. E. Higgins, D.V.S., Pathologist. This pamphlet gives the history, cause and occurrence, as well as the methods of infection, diagnosis and disposition of carcasses infected with anthrax. The pamphlet points out that veterinarians, farmers and others who have reason to suspect the existence of anthrax are compelled, under the Animal Contagious Diseases Act, to promptly notify the Minister of Agriculture, the Veterinary Director-General or the nearest Veterinary Inspector.

LIVE STOCK BRANCH

The Feeding and Housing of Swine is the title of Pamphlet No. 22. This publication is prepared by Professor G. E. Day in charge of the Bacon Production Campaign for the Dominion Government in correlation with Mr. E. S. Archibald, Dominion Animal Husbandman, and Mr. G. R. Rothwell, Assistant Dominion Animal Husbandman. This pamphlet is designed as a hand book for ready reference for farmers in assisting them to manage to the greatest possible advantage the small herd of sows and market pigs which should be maintained on the average farm.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

ONTARIO

War Breads. This publication, designated Bulletin No. 254 of the Ontario Department of Agriculture, is issued by the Women's Institutes Division. It consists largely of recipes of breads, biscuits and gems, etc., in which meals other than white flour are used. It also contains an announcement of demonstration lecture courses to be held by the Women's Institutes during the coming fall and winter.

Bulletin No. 253, Dairy Cattle. This bulletin, prepared by Professor A. Leitch, H. M. King and J. P. Sackville, members of the staff of the Ontario Agricultural College, deals with the economy of dairy farming, the breeds of dairy cattle kept in Ontario and a general treatment of the subject covering breeding, feeding, housing and the health of dairy cattle.

Report of Women's Institutes, 1916, Part I. This report of Geo. A. Putnam, Director of Institutes for Ontario, contains a statistical table of the Ontario Women's Institutes for the year 1915-16 and reports of the conventions held in Ottawa, London

and Toronto. The report also contains a section devoted to rations for war time.

Report of the Stallion enrolment Board, 1917. The stallion enrolment year ends on July 31st. This report contains, in addition to the Ontario Enrolment Act, the regulations under it, lists of recognized books of records, summary of the enrolment by counties for the years 1913-17, inspection routes to the fall of 1917 and other information of value to stallion owners.

MANITOBA

The Farmers' Library: Bulletin Nos. 15, 16 and 17 of this series, published in connection with the Extension Service of the Manitoba Agricultural College, which have just been issued, comprise "Poultry Houses for Farm and Town", by M. C. Herrero, B.S.A., Professor of Poultry Husbandry; "Cookery Recipes", by Miss Elizabeth Crawford, Cookery Demonstrator, and "Vegetable Storage", by F. W. Broderrick, B.S.A., Professor of Horticulture and Forestry, and L. J. Smith, B.S.A., Professor of Agricultural Engineering. They are bulletins of 40, 53 and 12 pages respectively, and are illustrated with half-tone cuts and diagrams.

SASKATCHEWAN

Live Stock Commissioner's Report. The fifth annual report of the Live Stock Commissioner for Saskatchewan covers the year ending April 30, 1917, and makes a book of 62 pages. After a thorough review of the live stock situation and prospects, the report chronicles the activities of the various provincial breeding associations, the veterinary association and the winter fair board and records the working of the different legislative Acts affecting live stock.

BRITISH COLUMBIA

The Eleventh Annual Report of the British Columbia Dairymen's Association. This publication constitutes a report of the annual convention of the British Columbia Dairymen's Association held in January, 1917. It also contains reports of cow-testing associations, milk and cream competitions, milk producers competitions, butter competitions and the constitution and by-laws of the Association.

MISCELLANEOUS

Flax Convention. This pamphlet consists of the proceedings of the convention of Canadian flax growers, held at London, Ontario, last spring. At this meeting the flax industry of Canada was fully discussed from the standpoint of the past and the future. A part of the convention was taken up with the annual meeting of the Canadian Flax Growers Association, of which G. G. Bramhill, B.S.A., Chief of the Fibre Division of the Experimental Farms, is the secretary.

The Holstein-Friesian Association for Canada. The Canadian Holstein-Friesian book contains a list of all official and semi-official butter and milk records which have been admitted to the Record of Merit and Record of Performance, together with a list of all record cows under their sires and under their dams with the proven sons of such sires and dams, also the highest record cows in each division. The secretary of the association is W. A. Clemons, St. George, Ont.

*A preliminary list of the insects of the province of Quebec—Part III—*of the series issued as a supplement to the report of the Quebec Society for the Protection of Plants. The insects included in the list are of the Coleoptera Order, Parts I and II preceding it, dealt with the Lepidoptera and Diptera respectively. In his introductory note, Professor W. Lochhead, President of the Quebec Society for the Protection of Plants, states that other parts will follow as soon as they are prepared.

Canadian Food Bulletin. The Food Controller has commenced the publication of the "Canadian Food Bulletin", the first number of which is dated October 6th and the key note "Produce—Conserve—Substitute". It is published for the information of official organizations co-operating in the work of food control and all other bodies or individuals interested. It will be issued as a means of keeping the provincial committees in touch with the operations of the central office and will provide practical reports on the progress of the work of the provincial committees. This number contains, in addition to items of official information, an article by the food controller on "The Cost of Lower Prices", a statement of Mr. Hoover's policy and reports of provincial bodies.

NOTES

In 1908 there were 6,898,451 sheep in South Australia; in 1915 there were 3,674,547, a decrease of 3,223,904, or over 53 per cent.

In consequence of drought in certain parts of Texas, the United States government has been assisting in the removal of cattle from that state to points in the south-eastern states.

In 1912 Manitoba had not enough butter to supply the needs of the province. In 1916 there were shipped out of the province after supplying the domestic demand, 70 car-loads of butter.

The directors of the Thunder Bay Co-operative Marketing Association will market this year's potato crop through the association. A manager has been engaged to work on a commission basis of four per cent.

In Grenville county, Ontario, five of the tractors supplied by the Department of Agriculture have been operated from sixteen to nineteen hours per day. Dashboard lanterns were used on most of the machines.

An extensive woman farmer in Middlesex county, Ontario, has donated a cup to be given for the best school garden in the township in which she resides. The cup will have to be won three years before becoming the property of the winning school.

At the Dominion wool storage warehouse in Toronto on October 18th, 20,000 lb. of Alberta wool were sold at 66 1-16c. per lb. and a few days later 12,000 lb. were sold at 68c. per lb. Up to that date over 830,000 lb. of wool had been disposed of at the warehouse and 200,000 lb. of western wool was on hand.

Mr. W. P. Macdonald, District Representative for Lambton county, Ontario, reports that advantage is being taken by farmers in that county of the freight rebates on feeding steers and breeding heifers. Twenty cars of cattle have already been secured from Winnipeg in this way.

To demonstrate the value of under-draining Mr. R. H. Clemens, District Representative for Wellington county, Ontario, has placed two sheaves of grain in his office window, one taken from a piece of undrained land and the other from a corresponding piece of land in the same field that had been drained in a drainage demonstration conducted by the department of Physics of the Ontario Agricultural College.

Mr. H. S. Dorrance, District Representative for Dufferin county, reports the results of some drainage work carried out on a farm near Orangeville. Last year, previous to draining, the crop of eleven acres was handled in two loads. This year, the same area required one hundred pounds of twine to bind the crop, which amounted to about fifty loads.

In the county of Elgin, Ontario, the District Representative organized an automobile excursion from the eastern to the western part of the county. One hundred automobiles, led by the officers of the Board of Agriculture, made the tour, stopping at some of the prominent homes and other places of interest. A visit was made to a farm on which a tractor, supplied by the Department of Agriculture, was in operation.

The Director of the Extension Department of the Saskatchewan College of Agriculture has addressed a circular to the presidents and secretaries of agricultural societies, pointing out that hereafter agricultural societies that allow fakirs, wheels of fortune and other questionable attractions to operate at their agricultural fairs, will be deprived of the support that they have been receiving from the Department of Agriculture.

Mr. Wm. E. Scott, Deputy Minister of Agriculture for British Columbia, as Chairman of the British Columbia committee organized to secure contributions on behalf of the British Empire Agricultural Relief to the Allies Fund, has issued strong appeals to the Farmers' Institutes and Women's Institutes of British Columbia. The appeals are addressed to the secretaries, who are asked to call special meetings of the members to deal with the matter.

The Dairy Recorder at Scotsburn, N.S., Mr. H. R. Brown, has prepared a series of six lessons for use in the public schools that he terms "Five Minute Talks on Dairy Subjects." The Director of Rural Science for the Province, Mr. L. A. DeWolfe, says of them, "They combine good history, geography, arithmetic and agriculture in a way that is simple yet striking." The following sample of the questions that accompany Lesson 4 will indicate the character and suggestive value of the series:—

- Q. 1.—The average cow in Nova Scotia gives 3,300 lb. of milk in a year.
- Suppose that in 100 lb. of her milk there are 5 lb. of fat. How much fat will she produce in a year?
 - How much fat will she produce in a year if there are only 3 lb. of fat in 100 lb. of milk?
 - With butter fat at 35 cents a lb. how much difference would there be in the value of her milk at 3 per cent or 5 per cent fat?

INDEX TO PERIODICAL LITERATURE

The Canadian Horticulturist and Bee-Keeper
Toronto, Oct., 1917.

The McIntosh and Fameuse in Quebec, Prof. T. G. Bunting, Macdonald College, page 269.

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The Problem of Country Life. Dean Klinck Traces Growth of Agriculture Through History, page 5.

The Eradication of Weeds. How to Overcome the Field Pests of the Farm, John Adams, M.S., Assistant Dominion Botanist, page 14.

The Canadian Poultry Review, Toronto, Oct., 1917

Poultry Houses for Farm and Town, M. C. Herner, B.S.A., Professor of Poultry Husbandry Manitoba Agricultural College, Winnipeg, page 408.

The Canadian Thresherman and Farmer, Winnipeg, Man.

The College is the Community Builder. What Manitoba Agricultural College is doing for Western Canada, page 5.

Farm and Ranch Review, Calgary, Alta., Sept. 30, 1917.

Vealing Calves vs. Beef Production, page 821.

Co-operative Egg Marketing in France T. A. Benson, Edmonton, Dominion Poultry Representative for Alberta, page 822.

Oct. 5—Seed Selection and Breeding, G. H. Cutler, Professor of Cereal Husbandry, University of Alberta, Edmonton, Alta., page 870.

Sheep in Western Canada. Address by A. A. Dowell, Professor of Animal Husbandry, University of Alberta, Edmonton, at Western Canada Irrigation Convention, Maple Creek, page 873.

Oct. 20th—Breeding the Farm Flock, W. H. Tisdale, page 919.

The Nor'-West Farmer, Winnipeg, Man., Oct. 5, 1917.

Home Canning of Surplus Vegetables, Mrs. Rutter, University of Saskatchewan, page 1074.

The Canadian Countryman, Toronto, Ont., Sept. 29, 1917.

Plan Now for Winter Feeding, Daniel McKee, B.S.A., page 1212.

Oct. 13—Should a Dairy Farmer Specialize, H. H. Dean, page 2.

Oct. 20—Cheese at 21 $\frac{3}{4}$ Cents—Has it been Enough, H. H. Dean, page 1297.

Farm and Dairy and Rural Home, Toronto, Sept. 27, 1917.

Best Feeds for Alberta Dairy Cows. Suggestions for the Dairyman of the Foothills, S. G. Carlyle, Supt. Demonstration Farm, Edmonton, Alta., page 1041.

Oct. 25th—Practical Poultry Methods at Macdonald College—Some Observations Made During a Short Visit with Professor M. A. Jull, page 1136.

Canadian Forestry Journal, Woodstock, Ont., Sept. 1917

What the Woodlot means to the Farm, Roland D. Craig, Commission of Conservation, page 1292.

Educational Review, St. John, N.B. Oct., 1917.

Household Science for High Schools, Kate Thompson Connolly, Walford, Ont., page 96.

Canadian Forestry Journal, Woodstock, Ont., October, 1917.

How New Bird Protection Will Work Out, Dr. C. Gordon Hewitt, Dominion Zoologist, page 1343.

The Farmers' Advocate, London, Ont., October 25th, 1917.

The Value of Mineral Elements in Poultry Feeding, M. A. Jull, page 1660.

Oct. 19—A Vigorous Letter on the Milk Question, H. H. Dean, O. A. C. Guelph, page 1624.

The Farmers' Advocate, Winnipeg, Man., October 24th, 1917.

Wintering Eees in Manitoba, R. M. Muckle, Provincial Apiarist, Manitoba Department of Agriculture, page 1474.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

The Institute is an international clearing house of agricultural information, trade and statistics, a State institution made up of fifty-five adhering countries.

The Canadian Commissioner furnishes the Institute the information needed concerning Canada, and in this connection solicits the active co-operation of all the readers of this section. It is particularly desired that duplicate copies of articles to be published in current periodicals or reports, summarizing results of original research and investigations of universal interest, be sent to the Canadian office for communication to the Institute, to be available for publication in one or other of its three original monthly bulletins. Similarly, duplicate copies of all agricultural reports and writings, whether official or not, are requested for the Rome and Ottawa libraries.

The Canadian Commissioner makes available to Canadians information published by the Institute, for which purpose this section of THE AGRICULTURAL GAZETTE is published monthly. It contains articles and summaries from the original Institute publications. Owing to lack of space many articles are merely indicated, but may be secured upon application to the Commissioner.

Similarly, the Canadian office cheerfully collaborates with anyone desiring to investigate details of foreign agricultural methods and processes, legislation, organization or administration. The Institute library at Ottawa, which has been made as nearly as possible a reproduction of the great International Agricultural Library at the headquarters of the Institute, Rome, now contains about 35,000 books, reports and pamphlets, and a reference catalogue of some 165,000 cards, which includes a complete set of the cards of the U. S. library of Congress referring to agriculture. There are also some 350 periodicals, a great many of which are indexed by the H. W. Wilson Agricultural Index and are consequently easily available for the investigation of current questions. Anyone who may be unable to visit the library in person may write to the Commissioner, who will, if desired, have appropriate bibliographies and memoranda prepared on any given subject.

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

The original Institute Bulletins may be obtained direct from the General Secretary of the International Institute of Agriculture, Rome, Italy. The subscription rates postpaid are as follows:

	Per annum
International Review of Agricultural Economics.....	18 francs
International Review of the Science and Practice of Agriculture.....	18 "
International Crop Report and Agricultural Statistics.....	6 "
The Three Bulletins together.....	36 "

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

The International Trade in Feeding Stuffs.

—In the *International Review of the Science and Practice of Agriculture*, Year VII, No. 4, pp. 489-551. Rome, April, 1917.

This third *Annual Review* gives the *International Trade in Feeding Stuffs*, up to the end of 1916 as far as the present conditions allow, and according to the scheme established in the second Review. The first two Annual Reviews were given in the April 1915 and April 1916 numbers of the Institute Bulletin.

Two new headings have been introduced: soya and soya-cake, brewing residues; for these are given, under the heading *coefficients*, the factors used to calculate the production of concentrates on the basis of the available supply of raw materials.

Although international events have decreased the trade, as is shown by the figures given, it is fairly clear that the importation of soya into countries using concentrates should regain its hold and thus it will be useful to define in future the extension of this trade. Brewing-residues have become still more important as concentrated foods (including yeast and dried lees) with or without preparation, and it is certain that some countries do not as yet completely utilize these by-products.

As regards colza, the production in India is given, as only the current figures are of importance.

In a new table of the prices of various concentrates are given the rates of various products (rice bran), locust bears, brewers' grains) which at the present time are of more than usual interest.

In the table of prices of various cakes, the rate of sesame and palmtree cake are given together with those of soya, and sunflower cake as quoted on the principal markets.

Appended are a few general remarks on each of the various chapters.

Production.—The new regulations requiring a higher yield of bread-flour from wheat has caused a decreased production of bran in various countries. Similarly in the trade in oil seeds and fruits, a general decrease is observed, resulting in the production of less cake, especially in the importing countries. As regards palmtree, trade has been so disturbed that the production of palmtree cake has become concentrated in the United Kingdom. A lower yield in sugar-beet by-products is also observable in the countries for which figures are given, because the production of raw material has decreased; from this the United States is excepted as there the growth of sugar-beets has much increased.

Foreign Trade.—Similar effects are seen as in production.

The trade in concentrated foods has almost ceased, due to difficulty of transport and also part to the insufficient production of forage in the exporting countries, especially in South America.

Price.—The lack of supplies on the markets has resulted in a large increase in prices, which is also due to other causes.

Bibliography.—The number of publications that have been examined in the International Institute of Agriculture and which are quoted in the bibliography, amounts to 680 titles, mostly referring to work done in finding new feeding stuffs for supplementing the lack of ordinary forage.

The article in the Institute Bulletin contains a series of tables, extending over thirty-five pages, giving in detail the production, imports, exports and prices of feeding stuffs in the different countries. The feeding stuffs covered include wheat bran, rye bran, rice residues, linseed cakes, cottonseed cakes and meal, colza, groundnuts, sesame, soya, copra, palm kernels, sugarbeet residues, residues from brewing, cereals, etc.

CROPS AND CULTIVATION

The Recent Work at Rothamsted on the Partial Sterilization of the Soil.—RUSSELL E. J. D.Sc., (Director of the Rothamsted Experiment Station), in *The International Review of the Science and Practice of Agriculture*, Year VIII, No. 5, pp. 673-681. Rome, May, 1917.

The investigations which I propose to describe began in the first instance as the result of an accident. In virtue of its large population, soil absorbs a considerable quantity of oxygen and evolves a corres-

ponding amount of carbon dioxide. An experiment had been arranged to demonstrate the well-known fact that soil heated to 130° C., and therefore completely devoid of micro-organisms, lost much of its power of absorbing oxygen. By an accident, the autoclave was not available and the soil was only heated in a steam oven, and it gave the remarkable result that its power of absorbing oxygen, instead of falling, as was anticipated, considerably increased. Now, the steam oven did not kill all the

organisms, but spared those capable of forming spores, i.e. sterilisation was only partial.

Partial sterilization by means of volatile antiseptics gave the same result. The conclusion was drawn that partial steriliza-

tion increased the bacterial activity, and consequently the amount of decomposition. The increased quantity of plant food thus formed is shown by the amounts taken up by the plant. Table I contains a typical series of results:

TABLE I.—Weight and Composition of Crops grown on Partially Sterilized Soils

	Dry Weight	Percentage Composition of Dry Matter			Weight of Food taken by the Plant from Soil, gms.		
	Grams	N	P2O5	K2O	N	P2O5	K2O
<i>Buckwheat.</i>							
Untreated Soil	18 14	2 75	1 81	5 62	0 499	0 339	1 019
Soil treated with Carbon Disulphide	23 27	3 15	2 34	5 97	0 733	0 544	1 389
<i>Mustard:</i>							
Untreated Soil	15 88	2 30	1 00	4 20	0 367	0 159	0 668
Heated Soil	24 33	4 43	2 08	5 02	1 077	0 506	1 221

This experiment confirmed the earlier results of OBERLIN and others.

Further investigations led to the following conclusions:

1.—Partial sterilization of soil, i.e. heating to a temperature of 60° C. (140° F.) or more, or treatment for a short time with

vapours of antiseptics such as toluene, causes first a fall, than a rise in bacterial numbers. The rise sets in soon after the antiseptic has been removed and the soil conditions are once more favourable for bacterial development; it goes on till the numbers considerably exceed those present in the original soil.

TABLE II.—Numbers of Bacteria and Amounts of Ammonia production in Partially Sterilized Soils

	Number of Organisms of Dry Soil in millions, Gelatin Plate Cultures			Ammonia produced in 9 days, in parts per million of dry soil
	At beginning	After 9 days	Increase during 9 days	
Untreated Soil	6 7	9 8	3 1	0 7
Soil heated to 98	0 0003	6 3	6 3	3 2
Soil treated with Toluene, which was subsequently evaporated	2 6	40 6	38 0	17 1
Soil treated with Toluene, which was left in	2 3	2 6	0 3	5 5

This confirmed the earlier results of HILTNER and STORMER.

2.—Simultaneously there is a marked increase in the rate of accumulation of ammonia. This sets in as soon as the bacterial numbers begin to rise, and the connection between the two quantities is normally so close as to indicate a casual relationship, the increased ammonia production is, therefore, attributed to the increased numbers of bacteria. There is no disappearance of nitrate: the ammonia is formed from organic nitrogen compounds.

3.—The increase in bacterial numbers is the result of improvement in the soil as a medium for bacterial growth and not an improvement in the bacterial flora. Indeed, the new flora *per se* is less able to attain high numbers than the old. This is shown by the fact that the old flora, when reintroduced into partially sterilized soil, attains higher numbers and effects more decomposition than the new flora. Partially sterilized soil plus 0.5 per cent of untreated soil, or an unfiltered aqueous extract of untreated soil, soon contains

higher bacterial numbers per gram and accumulates ammonia at a faster rate than partially sterilized soil alone.

4.—The improvement in the soil brought about by partial sterilization is permanent the high bacterial numbers being kept up even for 200 days or more. The improvement, therefore, did not consist in the removal of the products of bacterial activity, because there is much more activity in partially sterilized soil than in untreated soil. Further evidence is afforded by the fact that a second treatment of the soil some months after the first produces little or no effect.

It appears from (3) and (4) that the factor limiting bacterial numbers in ordinary soils is not bacterial, nor is it any product of bacterial activity, nor does it arise spontaneously in soils.

5.—But if some of the untreated soil is introduced into partially sterilized soil, the bacterial numbers, after the initial rise, see (3), begin to fall. The effect is rather variable, but is usually more marked in moist soils that have been well supplied with

TABLE III.—*Effect of Reinfesting Untreated Soil into Partially Sterilized Soil.*

	Gain in Ammonia and Nitrate in 57 days	Number of Bacteria in millions per gram of dry Soil		
		After 20 days	After 38 days	After 61 days
Toluened Soil alone	24.3	28 0	31 8	60 1
Toluened Soil + unsterilized aqueous extract from Untreated Soil	43 7	61.3	45 2	166 6
Toluened Soil + 5% Untreated Soil	20 3	32 0	46 9	48.0

organic manures; e.g. in dunged soils, greenhouse soils, sewage farm soils, etc. Thus the limiting factor can be reintroduced from untreated soils. (Table III).

6.—Evidence of the action of the limiting factor in untreated soils is obtained by studying the effect of temperature on bacterial numbers. Untreated soils were maintained at 10°, 20°, 30° C., (50°, 68°, 86° F.), etc., in a well moistened aerated condition, and periodical counts were made of the numbers of bacteria per gram. Rise in temperature rarely caused any increase in bacterial numbers; sometimes it had no action, and often it caused a fall.

But after the soil was partially sterilized the bacterial numbers showed the normal increase with increasing temperatures. Similar results were obtained by varying the amount of moisture but keeping the temperature constant (20°C.) The bacterial numbers in untreated soils behaved erratically, and tended rather to fall than to rise when the conditions were made more favourable to tropic life; on the other hand, in partially sterilized soil, the bacterial numbers steadily increased with increasing moisture content. Again, when untreated soils are stored in the laboratory or glass house under varying conditions of temperature and of moisture content the bacterial numbers fluctuate erratically; when partially sterilized soils are thus stored the fluctuations are regular.

7.—When the curves obtained in (6) are examined, it becomes evident that the limiting factor in the untreated soils is not the lack of anything (1) but the presence of something active.

8.—This factor, as already shown, is put out of action by antiseptics and by heating the soil to 60°C., (140°F.) and once out of action it does not reappear. Less drastic methods of treatment put it out for a time, but not permanently: e.g., heating to 50°, (122°F.), rapid drying at 35°, (95°F.), treatment with organic vapour less toxic than toluene (e.g. hexane), incomplete treatment with toluene. In all these cases the rise induced in the bacterial numbers per gram is less in amount than after toluene treatment, and is not permanent; the factor sets up again. As a general rule, if the nitrifying organisms are killed, the limiting factor is also extinguished; if they are only temporarily suppressed, the factor is also only put out for a time.

9.—The properties of the limiting factor are:

a) It is active and not a lack of something else, see (7).

b) It is not bacterial, see (3) and (4).

c) It is extinguished by heat or poisons, and does not reappear if the treatment has sufficed to kill sensitive and non-spore-forming organisms; it may appear, however, if the treatment has not been sufficient to do this.

d) It can be reintroduced into soils from which it has been permanently extinguished by the addition of a little untreated soil.

e) It develops more slowly than bacteria, and for some time may show little or no effect; then it causes a marked reduction in the numbers of bacteria, and its final effect is out of all proportion to the amount introduced.

f) It is favoured by conditions favourable to trophic life in soil, and finally becomes so active that the bacteria become unduly depressed. This is one of the conditions obtaining in glasshouse "sick soils").

It is difficult to see what agent other than a living organism can fulfil these conditions. Search was therefore made for larger organisms capable of destroying bacteria, and considerable numbers of protozoa were found. The ciliates and amoebae are killed by partial sterilization. Whenever they are killed, the detrimental factor is found to be put out of action, the bacterial numbers rise and maintain a high level. Whenever the detrimental factor is not put out of action, the protozoa are not killed. To these rules we have found no exception. Further, intermediate effects are obtained when a series of organic liquids of varying degrees of toxicity is used in quantities gradually increasing from ineffective up to completely effective doses. The detrimental factor is not completely suppressed but sets up again after a time, so that the rise in bacterial numbers is not sustained. But the parallelism with ciliates and amoebae is still preserved: they are completely killed when the detrimental factor is completely put out of action; they are not completely killed, but only suppressed to a greater or less degree, when the detrimental factor is only partly put out of action.

Now this similarity between the properties of the detrimental factor and the protozoa is not proof that the protozoa constitute the limiting factor, but it affords sufficient presumptive evidence to justify further examination. The obvious test of adding cultures of protozoa to partially sterilized soil was made, but no depression in bacterial numbers was obtained; instead there was sometimes a rise. But in view of the history of investigations on malaria and other protozoan diseases no great significance was attached to this early failure.

At this stage the investigation was divided into two parts:

1.—The study of the soil protozoa.

2.—The effects of the limiting factor on the biochemical processes on the soil.

No attempt had ever been made in any of the above experiments to identify the protozoa, or even to ascertain whether any particular form existed in the soil in the trophic state or as cysts. The variety of forms was considerable, and it soon became evident that a definite protozoological survey of the soil was required.

This was accordingly put in hand. In order to give the survey as permanent a value as possible the investigations were not confined to the narrow issue whether soil protozoa do or do not interfere with soil bacteria, but they were put on the broader and safer lines of ascertaining whether a trophic protozoan fauna normally occurs in the soil, and, if so, how the protozoa live, and what is their relation to other soil inhabitants.

The first experiments were made by GOODEY mainly with ciliates, and indicated that these protozoa were present only as cysts. Subsequent investigations, however, by MARTIN and LEWIN established the following conclusions:

1.—A protozoan fauna in a trophic state normally occurs in soils.

2.—The trophic fauna found in the soil differs from that developing when soil is inoculated into hay infusions: the forms which appear to predominate in the soil do not predominate in the hay infusions, and vice versa, the forms predominating in the hay infusions do not necessarily figure largely in the soil.

3.—The trophic fauna is most readily demonstrated and is therefore presumably most numerous, in moist soils well supplied with organic manures, e.g. in dunged soils, greenhouse soil, sewage "sick" soils, and especially glasshouse "sick" soils.

Two methods were used for demonstrating the existence of the trophic fauna. The simplest is to place some of the soil in a porcelain dish and cover it with a fixative solution delivered through a funnel, the fixative solution being either picric acid or mercuric chloride dissolved in water till saturation is reached, and then

mixed with an equal volume of alcohol. In a short time a film is formed which can be picked up on cover slips and mounted in the usual way: it contains many of the organisms in the form in which they actually existed in the soil. Unfortunately, the method is not completely under control, and sometimes for no apparent reason it fails to work.

The second method is to blow air through a mixture of soil and water contained in a long glass tube (50 cc. long) and allow the bubbles to break against a cover slip coated with agar. Some of the protozoa detach themselves from the soil particles, are caught up in the bubbles, and then adhere to the agar on the slip.

By this method MARTIN and LEWIN found that the dominant forms in a rich cucumber soil were amoebae: one was of the limax type to which they gave the name *Vahlkampfia soli*, one of the lamellipodian type which they called *Amoeba cucumis*, and there were two types of Thecamcebae, a *Euglypha* and a *Trinema*. A garden soil of poorer quality contained a more varied fauna, both of amoebae and thecamcebae, but apparently in smaller numbers. Small monads also were numerous.

Finally, the latest experiments by GOODEY have shown that when this trophic fauna is introduced into partially sterilized soils the bacterial numbers are brought down. The earliest attempts to carry out this experiment failed, as already stated, only one successful experiment by CUNNINGHAM being on record. It was not till GOODEY discovered the conditions for successful inoculation that it could be carried out. GOODEY found that mass cultures of protozoa failed when introduced direct from a culture medium into partially sterilized soils, but succeeded when introduced through the medium of some untreated soil. In these circumstances the protozoa lived, and numbers of bacteria were reduced. The protozoa used in these investigations were amoebae of the limax type, these being the forms common in the soil.

Thus it was shown that these protozoa lead an active life in the soil, and that one result of their activity is to keep down the numbers of bacteria.

The further problem was put in hand of finding out how numerous are the protozoa in the soil, and how this activity varies with the different conditions obtaining in the field. A dilution method is adopted somewhat similar to that used for enumerating the soil bacteria. The investigation is still only in its early stages, but already it is clear that amoebae and flagellates are present in at least tens of thousands per gram of soil, while ciliates can only be found in hundreds. Some of the organ-

isms appear to be new to science, and many of them are of considerable interest.

The other part of the investigation consists in studying the effects of these detrimental organisms on the process of food production in the soil. For this purpose it is not necessary to find what the detrimental organisms are, it is sufficient to divide the soil organisms into two groups in their relations to the processes of food production; a useful group and a detrimental group. The latter are, more generally speaking, more readily killed than the former. Conditions that are harmful to active life in the soil tend, therefore, to reduce their numbers and lead ultimately to an increased activity of the useful bacteria. On the other hand, conditions favourable to active life tend to keep up the detrimental organisms and therefore to reduce the useful bacterial activity. It is thus possible to account for a number of obscure paradoxical effects that have hitherto caused considerable perplexity. It has already been observed by practical men in various countries that certain soil conditions harmful to the growth of organisms were ultimately beneficial to productiveness, such as long continued and severe frosts, long drought (especially if associated with hot weather), sufficient heat, treatment with appropriate dressings of lime, gas lime, carbon disulphide, etc.

Further it has been observed that conditions which are undoubtedly favourable to life, such as the combination of warmth, moisture, and organic manures found in glasshouses, lead to reduced productiveness after a time. This phenomena is spoken of as "sickness" by the practical man.

It is difficult to account for these results on the old view that the useful plant-food making bacteria are the only active micro-organisms in the soil. On the other hand, the new view that detrimental organisms are also present readily explains the observed facts.

The "sickness" that affects the soil of glasshouses run at a high pitch (such as cucumber houses), and less slowly at a lower pitch (such as tomato houses), has been investigated in some detail owing to its great technical importance. It was traced to two causes: an accumulation of various pests, and an abnormal development, especially in cucumber houses, of the factor detrimental to bacteria. The properties of this factor show that it is identical in character with that present in normal soil, and strongly indicate its biological nature. No evidence of a soluble toxin could be obtained. On the other hand some remarkably interesting protozoa and allied organisms have been picked out from these sick soils and described by MARTIN, LEWIN and GOODEY. Finally, it has been shown that the whole trouble can be cured by partial sterilization, and meth-

ods suitable for large scale work have been investigated and are now in use in practice. Steam heat at present proves most convenient, but the suitability and detailed effects of lime have been studied by HUTCHINSON and M'LENNAN, and of various antiseptics by BUDDIN.

On the technical side the investigation is being developed with a view to the discovery of cheap methods of partial sterilisation. Speaking generally, this type of work is done much better by practical men on their own holdings than at scientific institutions.

It was of course hopeless to try and interest the farmer in any method of partial sterilisation as the cost would be prohibitive, but it was not difficult to interest some of the market gardeners working under glass. Demonstrations made in their nurseries at once appealed to them, and showed that the results were worth having. In consequence of the many modifications they have introduced, the cost of working has greatly fallen and partial sterilization is now extensively practised both as a cure for sick soils and as a method of killing the soil insect and fungoid pests that cause so much havoc in the industry. A special Experiment Station has been set up in the district where the various problems arising out of the industry can be dealt with. One of these is the full investigation of the various methods of partial sterilization both by chemicals and by heat.

A list of papers on partial sterilization is given at the end of the article in the Institute Bulletin.

404—New Experiments on Soil Sterilization in France.—MIÈGE, M., in *Comptes Rendus hebdomadaires des Séances de l'Académie des Sciences*, Vol. 164, No. 9, pp. 362-265. Paris, February, 26, 1917.

Since 1914, the writer has made new experiments with regard to the fertilising influence and antiseptic value of the sterilization of soils. Great attention should be given to the study of this subject, not only in view of the increased yields which may be expected, but also because the sterilization of the soil greatly decreases the large losses suffered annually from the attacks of epiphytic parasites.

Two sets of experiments were carried out; the first in open fields and in gardens on: potatoes, buckwheat, beans, tomatoes, carrots, leeks; the second under glass and in the open, chiefly on tomatoes, but also on cucumbers and carnations.

The following antiseptics were used during the last two years:—toluene formol, lysol, shale oils, wood charcoal, potassium permanganate, hydrogen peroxide, calcium hypochlorite, sulphur, sulphides, etc. Most of these were applied

before sowing, a few were applied only after sprouting, whereas others were used in the preparation of vegetable mould or composts.

FIRST SERIES OF EXPERIMENTS.—The following results were obtained in clayey loam plots measuring 20 square metres each:

TABLE I.—Yields (in Kilograms) obtained in the 1st series of experiments.

Antiseptic Used	Beans	Tomatoes	Carrots	Potatoes	Buckwheat (green)
Toluene	—	—	37 100	13 760	45
Carbon bisulphide	—	—	—	12 880	44
Hydrogen peroxide	—	—	—	12 720	—
Lysol	—	—	42 500	—	—
Formol	—	—	—	12 740	43
Potassium permanganate	0 950	—	—	13 020	—
Copper sulphate	—	—	—	14 120	—
Sulphur	—	—	—	16 920	43
Calcium hypochlorite	1 250	50 500	—	—	46
Wood charcoal	0 900	—	—	12 720	—
Controls	0 550	35 000	14 165	8 440	40

The antiseptics had a marked effect, and their application was accompanied, not only by a notable increase in yield, but also by an undeniable decrease in disease and other injuries of the plants treated.

SECOND SERIES OF EXPERIMENTS.—These trials all gave similar results. They were carried out on more than 600 square metres of cultures under glass and more than 1 hectare in the open. These experiments were therefore no longer on a laboratory scale, and as the land was used for commercial purposes to a certain extent, it was necessary that immediate profits be realized.

In these tests, as in the previous ones, the yield was considerably increased and the treatment had a distinctly beneficial effect on the health of the plants. The land and glass-houses used had been devoted to the cultivation of early tomatoes for

15 years. It is obvious that continual intensive cultivation in the same warm and damp surroundings would make the vegetables particularly subject to all diseases, and indeed, in spite of the greatest care and attention, the plants were so infested with parasites, that growth was very seriously compromised and successful cultivation very uncertain. In this case, therefore, peculiar interest was attached to the sterilization of the soil.

The variety of plant used was more especially the "Joffre", a type with firm, smooth fruit. The control plots were between the experimental plots, and all were submitted to identical conditions of development. Table II gives the results per glass-house and per hectare (each glass-house had an area of 400 square metres and contained 1600 plants).

TABLE II.—Yield per Glasshouse and per hectare.

No. of glass-house	Antiseptic used	Amount used (kilograms)		Yield obtained (kilograms)		
		per glass house	per hectare	per glass-house	per plant	per hectare
1	Toluene	12	300	3 300	2 062	82 500
	Wood charcoal	30	750			
	Carbon bisulphide	10	250			
2	Wood charcoal	30	750	3 040	1 900	76 000
	Lysol (1st month)	1	—			
3*	Formol (2nd month)	1	—	2 200	1 375	55 000
	Toluene (2nd month)	1	—			
4	Wood charcoal (1st month)	10	—	2 400	1 500	58 000
	Lysol	5 at 5	1000			
5	Calcium hypochlorite	64	1 500	2 500	1 562	62 500
	Calcium hypochlorite	64	1 500			
7	Copper sulphate	10	250	2 550	1 570	63 750
	Wood charcoal	20	500			
8†	Hydrogen peroxide	500 litres	125	2 100	1 312	52 500
		at 10: 1000	—			
9	Sulphur	10	250	2 200	1 375	55 000
	Calcium hypochlorite	500 litres	125			
10	Wood charcoal	at 10: 1000	—	3 000	1 875	75 000
		25	625			
11	Potassium permanganate	600 litres	—	2 450	1 530	61 250
		at 5: 1000	75			
12	Formol	10 litres at 7:1000	—	2 350	1 470	58 750
		per cubic metre	—			
13	Sublimated sulphur	20	500	2 150	1 345	53 750
	Wood charcoal	25	625			
14	Naphthol B	5	125	2 800	1 750	70 000
	Open air	—	—			

* In Composts (pot cultures) — † Mixed.

The highest yield was 3,300 kg. per greenhouse, or more than 2 kg. of fruit per plant and 82,500 kg. per ha. These amounts were obtained with toluene or carbon bisulphide. The lowest yields, obtained from copper sulphate, exceeded 2,100 kg. per glasshouse, that is to say they gave an average of 1.31 kg. per plant and 52,000 kg. per ha.

If these results are compared with those obtained the same year at Rennes the following conclusions may be drawn:

1) Soil sterilization carried out under varied conditions (in the open, in glass-houses, in different soils) for different vegetables has been shown to exert a definite favourable influence on the yield as well as on the health and value of the products.

2) To a certain extent this action is specific as regards the nature of the chemical substances used and that of the plants treated with them. For example, toluene, then carbon bisulphide, give the best results for the same plant under the same conditions (Paramé tomatoes, under glass), whereas elsewhere, and on other cultures, hypochlorite, sulphur, etc., were found to have the most active and favourable effect.

These results fully confirm those already obtained by the writer as well as those obtained abroad and give further proof of the beneficial action of the antiseptic treatment of soils.

405—The Use of Iron in Agriculture.—MONNIER, A., and KUCZYASKI, L., (Compte rendu de la séance du 5 octobre 1916 de la Société de Physique et d'Histoire naturelle de Genève) in *Archives des Sciences physiques et naturelles*, Year 122, Vol. XLIII, No. 1, pp. 66-68. Geneva, January 15, 1917 (2 pp. in Institute Bulletin).

406—Researches on the Calcium Compounds in Soils in the United States.—SHOREY, EDMUND C., FRY, WILLIAM H., and HAZEN, WILLIAM, in *Journal of Agricultural Research*, Vol. VIII, No. 3, pp. 57-77. Washington, D.C., January 15, 1917.

407—Drainage by Dynamite in the United States.—*The South American Journal and Brazil and River Plate Mail*, Vol. LXXXII, No. 9, p. 181. London, February 24, 1917.

310—Explorations and Studies of the Beds of Phosphorites in Russia: Report for 1914.—SAMOILOV, JA. V., prof., in *Reports on Explorations and Studies of Phosphorite Beds*, Vol. VII, pp. 1-25 + 1-591, 54 fig. + 8 plates + 17 maps. Moscow 1915. (2 pp. in Institute Bulletin).

413—The Comparative Action of Ammonium Sulphate, Sodium Nitrate and some Organic Nitrogenous Manures: Pot Manurial Experiments in Russia.—JAKOUCHKINE, I., in *Annals of the Agri-*

cultural Institute of Moscow, Year 22, Vol. 1, pp. 137-144, Moscow, 1916. (1 page in Institute Bulletin).

416—A Saponin from *Yucca filamentosa*.—CHERNOFF L. H., VIEHOEVER, ARNO, and JOHNS CARL, O., in *The Journal of Biological Chemistry*, Vol. XXVIII, No. 2, pp. 437-443. Baltimore, Md., January, 1917.

417—A New Sugar Extracted from the Fruit of the Avocado (*Persea gratissima*).—I. LA FORCE, F. B., D. Mannoketoheptose a New Sugar from the Avocado in *The Journal of Biological Chemistry*, Vol. XXVIII, No. 2, pp. 511-522. Baltimore, Md., January, 1917.—II. WRIGHT, F. E., Crystallographic and Optic Properties of Mannoketoheptose and of the Osazones of Mannoketoheptose and Mannoaldoheptose, *Ibid.*, pp. 523-526, 2, fig.

418—The Part Played by Oxidases in the Improvement of Cultivated Plants; Biological Experiments and Considerations.—DEGLI ATTI, M., in *Annali della R. Scuola Superiore di Agricoltura di Portici*, Vol. XIV (Reprint), Portici, 1917. (2 pp. in Institute Bulletin).

313—Development of the Root System of *Cirsium arvense* and *Medicago sativa* with Reference to Their Vegetative Reproduction; Observations carried out in Russia.—PACZOSKI J. The biological peculiarities of *Cirsium arvense* Scop., in *Bulletin of Applied Botany*, Year IX, No. 1 (86), pp. 1-16. Petrograd, Jan., 1916.—II. (BERG, F.). Note on certain biological particularities of alfalfa and of *Cirsium arvense* Scop., *Ibid.*, No. 7 (92), pp. 353-357, July, 1916. (3 pp. in Institute Bulletin).

314—The Chemical Composition of Tobacco during its Vegetative Period. Researches Carried out in Russia.—KREVS, K., in *Review of Experimental Agriculture dedicated to the Memory of P. S. Kossovitch*, Vol. XVII, Pt. 4, pp. 278-288. Petrograd, 1916. (1 pp. in Institute Bulletin.)

This paper is a preliminary note on the results of experiments which aimed at determining the succession in which substances contained in the ripe tobacco plant accumulate, so as to improve the control in Russian tobacco of the results obtained abroad, and to complete them by more detailed information.

315—Freezing Point Lowering of the Leaf Sap of the Horticultural Types of *Persea Americana*: Experiments made in America.—HARRIS ARTHUR J. and POPENOE WILSON, in *Journal of Agricultural Research*, Vol. 7, pp. 261-268. Washington, D.C., 1916. (2 pp. in Institute Bulletin)

The introduction of tropical economic plants into the warmer portions of the

United States, which for the most part are not free from occasional frosts, depends upon the ability of the species to survive transient low temperature. Among the factors to which frost resistance in plants is due, the magnitude of the depression of the freezing point of the cell sap has been suggested as one of importance. The type in which the expressed sap freezes at the highest temperature is the least capable of enduring cold.

From the evidence presented in the paper, it seems highly probable that in the case of tropical perennials, a knowledge of the freezing-point lowering of the sap would be of some service in predicting their ability to withstand cold and in determining the northern limit of their cultivation.

316—Germination of the Seeds of *Lepidium sativum* in Solutions of Electrolytes. LESAGE, PIERRE, in *Comptes Rendus des Séances de l'Académie des Sciences*, Vol. 164, No. 2, pp. 119-121, Paris, Jan. 8, 1917. (2 pp. in Institute Bulletin).

318—The Action of Non-Nitrogenous Reserve Substances in Trees. ANTEVS, ERNST, in *Arkiv för Botanik*, Vol. 14, No. 3, pp. 1-23. Stockholm, 1916. (3 pp. in Institute Bulletin).

319—The Effects of Manganese and Iron on the Growth of Wheat.—TOTTINGHAM, W. E., and BECK A. J., in *The Plant World*, Vol. 19, No. 12, pp. 359-370, 2 Fig. Baltimore, December, 1916. (2 pp. in Institute Bulletin).

These experiments were carried out for the purpose of studying the antagonism between manganese and iron in the growth of wheat and the effect of manganese and ferric chlorides upon young wheat plants in water cultures: (iron-free Knop's solution with monopotassic phosphate).

As is shown in a table in the Institute Bulletin, manganous chloride in the presence of bi carbonate of sodium, even in small quantities, is injurious both to the roots and the green portions of the plant.

At high concentrations, sodium bicarbonate exercises a distinctly toxic effect, while ferric chloride, contrary to what was observed in the first series of experiments, stimulated the growth of the tops of the plants. This was evidently due to the alkalinity of the nutrient solution.

320—The Suppression of Characters on Crossing.—BIFFEN R. H. in *Journal of Genetics*, Vol. 5, No. 4, pp. 225-228. Cambridge, July, 1916. (2 pp. in Institute Bulletin).

420—New Practical and Scientific Experiments in the Selection of German Wheats Rich in Gluten.—VON CARON-ELDINGEN, in *Deutsche Landwirtschaftliche Presse*, Year 43, No. 14, pp. 112-114.

Berlin, 1916. (2 pp. in Institute Bulletin).

422—Improvement of Black Oats by Selection and Crossing in Sweden.—NILSSON-EHLE, H., in *Sveriges Utsädeforenings Tidskrift*, Year XXVI, No. 6, pp. 219-231, 2 fig. Malmö, 1916. (4 pp. in Institute Bulletin).

This paper gives the results of a series of experiments on selection and hybridisation carried out at Svalof from 1901-1917 in order to improve black oats in Central Sweden.

322—Strawberry Selection in the United States.—DARROW GEORGE M. in *The Journal of Heredity*, Vol. VII, No. 12, pp. 531-540, 6 fig. Washington, D.C., December, 1916. (2 pp. in Institute Bulletin).

323—Pyronia, a Hybrid Between the Pear and Quince.—TRABUT, L., in *The Journal of Heredity*, Vol. VII, No. 9, pp. 416-419, fig. 2. Washington, D.C., September, 1916.

427—The Behaviour of "Bolting" Beets.—MUNERATI, O., and ZAPPAROLI, T. V., in *Le Stazioni Sperimentali Agrarie Italiane*, Vol. 1, Part 1, pp. 5-24. Modena 1917. (3 pp. in Institute Bulletin).

430—The Importance of the Awns of Native Wheat in Hungary and of Barley in Sweden. I. FLEISCHMANN, RUDOLF, The Importance of the Awns in Native Hungarian Wheat, in *Zeitschrift für Pflanzenzüchtung*, Vol. 4, Pt. 4, pp. 335-346. Berlin, December, 1916.—II. TEDIN, HANS, The Effects of the Removal of the Awns on the Development of Barley Grain, Sweden, in *Sveriges Utsädeforenings Tidskrift*, Year XXVI, Pt. 6, pp. 245-253. Malmö, 1916. (2 pp. in Institute Bulletin).

325—Varieties of Hungarian Wheat Selected to Increase the National Production.—GRABNER EMILE, in *Kostelek*, year 26, No. 41, pp. 1459-1460. Budapest October 7, 1916.

326—Manitoba Wheat in Italy and France.—SIGNORINI, M., in *Il Coltivatore*, Year 63, No. 2, pp. 54-59. Casale Monferrato 1916.

The term "Manitoba" wheat includes all the types of wheat from that district. As a rule, amongst wheats from the same district one well-marked variety predominates, thus, amongst the different varieties of "Manitoba" wheat introduced into Italy and France, one in particular stands out. This wheat gives slender, tapering ears, which are only slightly bearded, with pointed glumes of a pinkish colour. The characteristics of this wheat are identical with those of *Red Fife*, which is much used in the north of the United States and in Canada. For this reason VILMORIN proposed to call this variety *Fife rouge* instead

of giving it the vague name of "Manitoba" *Red Fife* is the most widely used and best known of the spring wheats, especially in Southern America, on account of the favourable climatic and soil conditions. Before advising the use of Manitoba wheat for spring crops in Europe it will, therefore, be necessary to select, cross and study it. Below is a summary of the results obtained hitherto in Italy and France.

ITALY.—STEVANO, who has experimented with more than twenty varieties of wheat from Winnipeg, the capital of Manitoba, claims to have found good types, with small, light, plump grain of medium strength some of which may be recommended. As a rule "Manitoba" wheats ripen at the end of June or the beginning of July. They give a fairly profitable yield, with straw of medium height, stronger than that of "Cologna".

In the province of Caserte, CAMPBELL carried out an experiment which gave good results, and he advises the use of "Manitoba" in the south of Italy, especially when it has not been possible to sow the local variety in good time. Finally, VOLANTI states that, a few years ago, a farmer of Frugarolo (province of Alexandria) obtained a very fine and very abundant spring crop of "Manitoba" wheat, freely manured.

FRANCE:—SCHRIBAUX has set on foot an enquiry amongst the farmers who, in 1916, cultivated "Manitoba" which had been supplied by the Government. Although the crops were very varied, the ears being white, red, bearded or beardless, the opinion of French farmers was, on a whole, favourable. It must not be forgotten that:

1) Manitoba gives good results and a harvest which may exceed 20 cwt. per acre even if sowing is late and the local varieties cannot be successfully cultivated. Sowing must be abundant in order to counteract the limited stooling of the plant. There should be an average of $1\frac{1}{2}$ cwt. per acre.

2) "Manitoba" is strongly resistant to scorching which does so much damage to March wheat, and is also resistant to rust.

3) "Manitoba" is strong, very early, and resists sea-winds.

4) It should not be sown in clay or naturally moist soils as it then gives bad results.

5) As far as possible the soil should be well manured, as a plant which develops rapidly always needs a fertiliser: a large yield may thus be obtained.

327—Agricultural Procedures for Increasing the Production of Wheat.—DEVAUX, M., in *Comptes Rendus des Séances de l'Académie des Sciences*, Vol 164, No. 4, pp. 191-193. Paris, January 22, 1917. In 1915 and 1916, in the neighbourhood of Bordeaux, the author experimented in

the production of wheat by DEMTCHINSKY's method, that is to say, by early thin sowing continuous earthing up and the transplantation of the best plants. He cultivated 4 varieties:—Hybride inversable de Vimorin, Rouge de Bordeaux, Bon Fermier, bearded Kieti. He found that all the wheats grew well under the conditions described above and produced an extraordinary number of ears. Red Bordeaux, one of the varieties which stools least, produced, on 6 square metres, 177 plants, at an average of 9.5 culms per plant, or a total of 1687 stems corresponding to an average of 30 per square metre, with 261 culms of which 116 were produced by 6 large plants.

328—Cereal Experiments in Montana and in Wyoming, United States.—I. DONALDSON, N. C., Cereal Experiments at the Judith Basin Substation Moccasin, Montana *United States Department of Agriculture Bulletin*, No. 398, 41 pp., 17 fig. Washington, October 12, 1916.—II. JONES, JENKIN W., Cereal Experiments on the Cheyenne Experiment Farm, Archer, Wyoming, in *United States Department of Agriculture Bulletin* No. 430, 39 pp. 12 fig. Washington, D.C., October 18, 1916. (7 pp. in Institute Bulletin).

431—Wild and Cultivated Fodder Crops of the Bombay Presidency, India.—I. MANN, HAROLD H., Fodder Crops of Western India, in the *Department of Agriculture, Bombay, Bulletin* No. 77 of 1916, pp. 142, Poona, 1916.—II. BURNS, W., BHIDE, R. K., KULKARNI, L. B., and HANMANTE, N. M., Some Wild Fodder Plants of the Bombay Presidency. *Ibid Bulletin*, No. 78 of 1916, pp. 24 + XXXIV plates.

432—Transplanting Alfalfa.—HANSEN, N. E., in *Agricultural Experiment Station, South Dakota State College of Agricultural and Mechanical Arts, Department of Horticulture, Bulletin* No. 167, pp. 424-445, fig. 8. Brookings, South Dakota, June, 1916. (2 pp. in Institute Bulletin).

In the spring of 1907, the writer bought small lots of new alfalfas from Siberia and other parts of Russia. As it was very necessary that as large an acreage should be obtained as possible, the alfalfa was planted in rows, and the ground was kept clean and hoed. These transplanted individuals made such tremendous growth, that the writer has continued to work along this line, and in the spring of 1912, he started the machine transplanting of alfalfa.

The writer does not advise that alfalfa transplanting should be generally adopted. The method must be worked out slowly by the actual experience of many farmers.

According to the writer, the advantages of the transplanting system are as follows:

1) With an economy of seed, an alfalfa

is obtained which, being strong and vigorous, at once takes possession of the soil and does not suffer, the first year, from the competition of dodder and other weeds.

2) When transplanted in autumn, the alfalfa occupies the ground for one season less. Thus another crop can be obtained in the rotation.

3) Transplanting is a sure manner of insuring inoculation.

4) Plants in hills may be kept cultivated and free from dodder and other weeds, so the seed raised from these plants is absolutely pure (100%).

5) The roots and tops of these isolated plants attain a huge size, and consequently the seed is more abundant, plumper, and heavier and is thus of greater commercial value.

332—The Cultivation of Potatoes from Potato Skin; Experiments Carried out in Italy.—CASTALDI, G., in *Società degli Agricoltori italiani, Bollettino, quindicinale*, Year XXII, No. 3, pp. 44-46. Rome, February 15, 1917.

Area of each plot.
Quantity of material used for planting.
Potatoes harvested

In the spring of 1916, at S. Angelo of Alifa (Province of Caserta), the author carried out experiments on the cultivation of potatoes by cutting the skin into strips about 2 mm. thick (that is to say, with some of the flesh still adhering to it), with the eyes. From 100 parts by weight of potatoes he obtained 45.5 parts of skin for planting and 54.5 parts which could be used for food or trade purposes. The experiments were carried out on square plots, all of which had been similarly treated as regards the preparation of the soil and manuring.

On the 19th March alternate plots were planted with whole potatoes and skins of the same variety respectively. Identical methods of cultivation were carried out at the same time on all the plots. The harvest was gathered on the 4th August. The vegetation of the different plots was uniform and there was no great difference in the yields. The average yields were as follows:

Yield from whole potatoes	Yield from skin in strips
43 sq. yards. 120 lbs. 633 lbs.	43 sq. yards. 55 lbs. 619 lbs.

In terms of weight per acre these results show that 5½ cwts. of skin yielded 63½ cwts. of potatoes, whereas 12 cwts. of whole potatoes yielded 63¾ cwts.

444—Influence of Manganese on the Nitrogen Content of Sugar Beets; Experiments in Germany.—ULRICH K., in *Batter für Rubenbau*, Year 24, No. 3, pp. 31-33. Berlin, February 15, 1917. (2 pp. in Institute Bulletin).

335—Fruitgrowing in New Zealand.—LONGTON, J., in *The Fruit World*, Vol. XVII, No. 12, pp. 384, Melbourne, December, 1916.

448—Statistics of Fruits in the Principal Countries.—RUDDIMANN, H. D., in *United States Department of Agriculture, Bulletin* No. 483, 40 pp. Washington, D. C., February 14, 1917.

The above-mentioned bulletin presents in a concise form statistics of fruit and fruit products (oil, wine) in the principal producing, exporting and consuming countries.

450—Apples: Production Estimates and Important Commercial Districts and Varieties.—GOULD, H. P., and ANDREWS, F., in *United States Department of Agriculture, Bulletin* No. 485, pp. 1-48. Washington, D.C., January 20, 1917. (2 pp. in Institute Bulletin).

452—The Yield of Unpruned Vines.—DALMASSO, G., in *La Rivista di Viticoltura, Enologia ed Agraria*, Year 23, No. 4, pp. 49-50. Conegliano, February 15, 1917.—II. RAVAZ, L., in *Le Progres agricole et viticole*, Year 34, Vol. LXVII, No. 10, pp. 221-224, Montpellier, March 11, 1917. (1 page in Institute Bulletin).

LIVE STOCK AND BREEDING

458—Auto-Inoculation and Early Development of the Larva of the Horse-Bot (*Gastrophilus intestinalis*) in the Membranes of the Mouth Cavity.—ROUBAUD, E., in *Comptes Rendus des Séances de l'Académie des Sciences*, Vol. 164, No. 11, pp. 453-456. Paris, March 12, 1917. (1 page in Institute Bulletin.)

459—Diagnosis of Tuberculosis (Especially the Bovine Form) by Complement Fixation.—EICHORN, A., and BLUMBERG, B.,

in *Journal of Agricultural Research*, Vol. VIII, No. 1, pp. 1-2. Washington, D.C., January 2, 1917. (3 pp. in Institute Bulletin.)

342—Contribution to the Knowledge of the Strongylid *Syngamus bronchialis* in Domestic Poultry.—FEUREISSEN, W., in *Zeitschrift für Fleisch- und Milchhygiene*, Year 27, No. 2, pp. 17-22. Berlin, Oct. 15, 1916.

464—Sound Reasons for Pure Breds.—SEVERSON, B. O., in *The Field*, Vol. XXVI, No. 8, pp. 670-672. New York, August, 1916.

Although pure-breds offer a greater surety of merit in selection than do scrubs, there are animals amongst them which are not necessarily desirable. The importance of individual merit even for pure-breds may be gathered from the data contained in a table compiled from the Advanced Registry of the Holstein-Friesian breed up to May 15, 1912, which includes 1191 bulls.

From these facts it is apparent that the percentage of bulls having the highest number of Advanced Registry daughters come from parents that were recorded in the Advanced Registry; this is indicated by an increase of from 50 to 100%. Similarly the breeding merit of cows is determined by heredity, as is seen in a table which shows an increase of from 58 to 100% in the number of daughters whose dams were entered in the Advanced Registry. With cows, as with bulls, the most prepotent animals are those whose merit depends upon performance based on heredity.

345—Statistical Data Relating to the Age of Cattle Used as Breeders in Maine, United States.—PEARL, RAYMOND, in *Maine Agricultural Experiment Station, Report of Proceedings on Animal Husbandry Investigations in 1915*. No. 519-12-15, pp. 19-22. Orono, Maine.

The age of the animals is an important factor in many problems of cattle breeding.

The effect of age upon the milk production of a cow is well-known, and the profitable limits of age of a cow as a milker can be determined with precision. No principle of genetic science seems to be more solidly grounded than that progeny performance is the only test of breeding worth. This principle, however, plays no part in the breeding of a herd, if a herd bull is disposed of before any of his progeny have reached an age when their performance as milkers can be measured.

These considerations led the writer to collect from the best-known Maine farmers and breeders the statistical data given in a table in the article in the Institute Bulletin, which is both a birth record and a service record.

The average age of the herd bulls used to sire the 967 calves included in the statistics was just under 3 years. The median age of these herd bulls was approximately 2½ years. This means that 50 per cent of the calves were sired by bulls under 2½ years old; 75 per cent of all the calves (as shown by the third quartile age) were sired by bulls less than about 3¾ years at time of service. Less than 15 per cent of the calves were sired by bulls 5, or more, years old.

The importance of this fact cannot escape the attention of breeders. A bull must be at least 3 years old before the breeder can possibly have any opportunity of testing the milk producing capacity of its progeny, but 58.9 per cent of all the calves figuring in these statistics were sired by bulls under 3 years of age.

More than half of the calves produced in a given interval of time are sired by bulls about whose ability to transmit milking qualities nothing definite can be known. If the same conditions regarding cattle breeding methods obtain in other places generally, it is not remarkable that progress in milch cattle selection is so slow.

In the female part of the herd the selection conditions are better. If we exclude heifers bred for their first calves, the average age of the breeding cows is, approximately, 5½ years. This is the age when, on the average, cows are nearly, if not quite, at their best as regards milk production.

Out of 878 calves, 166, or 18.9 per cent, were the first calves of heifers. The average age of these heifers when successfully served for these first calves was about 1 year and 7 months. ¾ of the heifers were served before they were 2.1 years old.

465—Feeding Experiments of Pure Bred Draft Fillies in Illinois.—EDMONDS, J. L., in *The Field*, Vol. XXVIII, No. 2, pp. 95-97 and 128. New York, February, 1917. (2 pp. in Institute Bulletin).

347—The Influence of the Plane of Nutrition of the Cow Upon the Composition and Properties of Milk and Butter Fat; Experiments Carried Out in America.—I. ECKLES, C. H., and PALMER, L. S., Influence of Over-Feeding, in *University of Missouri, College of Agriculture, Agricultural Experiment Station Research Bulletin* No. 24, 39 pp. 8 + IV Tables, 4 fig. Columbia, Missouri, May, 1916. —II. Influence of Under-Feeding, *Ibidem* No. 25, 107 pp. 26 + XI Tables, 15 fig., November, 1916. (3 pp. in Institute Bulletin).

467—The Efficiency of Certain Milk Substitutes in Calf Feeding.—CARR, R. H., SPITZER, G., CALDWELL, R. E., and ANDERSON, O. H., in *The Journal of Biological Chemistry*, Vol. XXVIII, No. 2, pp. 501-509. Baltimore, Md., January, 1917. (2 pp. in Institute Bulletin).

348—The Value of Silage.—DORMAN, J. E., in *Hoard's Dairyman*, Vol. LII, No. 23, pp. 800 and 820. Fort Atkinson, Wisconsin, December 29, 1916.

Because there is no market for silage, other than through live stock, there has been much speculation as to what it is really worth as a feed for dairy cows.

Dairymen know in a general way that it is worth all it costs to grow and harvest

it, hence, they continue to build silos and fill them.

Through analysis and comparison with other feeds, silage is placed as only one-fourth as valuable as timothy hay, or \$4 per ton when timothy hay is worth \$16.

In actual feeding practice silage contains certain other properties that give it value far beyond what the analysis shows.

The dairymen know that their live stock thrive better and that they have less sickness in their herds when silage forms a part of the winter ration.

The figures below indicate that silage does play an important part in keeping up

the milk flow, which would, without this succulent feed, continue to decrease. While this experiment is not extensive enough to be conclusive, it does indicate to a certain extent what takes place in many of the herds that are being fed silage, and also indicates, that silage is really worth more than is generally estimated.

Forty cows from a herd of 71 were selected for this test. These cows had freshened prior to September 1st and all continued in full flow of milk through September, October and November.

The results of the test are summarized in the following table:

	Production	
	Milk lbs.	Fat lbs.
September. Pasture, hay in rack, and grain	28 241	929.8
October: Pasture hay in rack, and grain	25 518	813.1
November: Hay and silage	29 028	925.2
Decrease: September to October	2 723	86.7
Assuming like decrease October to November	2 723	86.7
Total decrease without silage would have been	5 446	173.4
November yield with silage was	29 028	925.2
Without silage would have been	22 795	756.4
Total decrease without silage would have been.	6 233	168.8

From the above figures, we deduce the following values:

Value of increased butterfat at 27.5c	\$46 42
Value of skim milk at 25c. per cwt	15.58
Total value of increased production	\$62.00
Increase to each ton silage fed	3 44
Each ton of ensilage fed replaced:	
330 lb. grain valued at \$1 per cwt	3.30
600 lb. hay valued at \$5 per ton	1 65
Value ton of ensilage	\$8.39

The value of both grain and hay has approximately doubled since this experiment was conducted.

349—Care, Feed and Management of the Dairy Herd in Iowa.—KILDEE, H. H., in *Sixteenth Annual Iowa Year Book of Agriculture*, pp. 495-532. Des Moines, Iowa, July 1, 1916. (7 pp. in Institute Bulletin).

350—Ewes' Milk, Its Fat Content and Relation to the Growth of Lambs: Studies Made in the United States.—RITZMAN, E. G., in *Journal of Agricultural Research*, Vol. VIII, No. 2, pp. 26-29. Washington, January 8, 1917. (3 pp. in Institute Bulletin).

468—Lamb Feeding in Texas.—JONES, J. M., in *The Breeders' Gazette*, Vol. LXXI,

No. 7, pp. 327-328. Chicago, February 15, 1917. (2 pp. in Institute Bulletin).

469 Injurious Effect of Palpating Laying Hens in order to Determine the Presence of Eggs.—KITT, TH., in *Monatshefte für praktische Tierheilkunde*, Vol. 28, Part 5-6, pp. 256-265. Stuttgart, Mar. 20, 1917. (2 pp. in Institute Bulletin).

351—Egg-Laying Record of White Leghorn Pullets.—HANSON, S. G., in *The Journal of the Board of Agriculture*, Vol. XXIII, No. 10, pp. 997. London, January, 1917.

354—New Freezing Process for the Preserving of Fish.—KALLERT, E., in *Zeitschrift für Fleisch und Milchwirtschaft*, 26th Year, Part 23, pp. 352-355. Berlin, Sept. 1, 1916. (1 page in Institute Bulletin).

FARM ENGINEERING

473—The Comparative Costs of Using Agricultural Machinery in the United States and in France.—RINGELMANN, MAX, in *Journal d'Agriculture pratique*, Year 81, No. 1, pp. 18 20, No. 2, pp. 29-30. Paris, January 11 and 25, 1917.

(3 pp. in Institute Bulletin).

474—The Comparative Cost of Tractor and Horse Power, in the United States.—MORRISON, F. L., in *Farm Implement News*, Vol. XXXVIII, No. 6, pp. 43-45. Chicago, Feb. 8, 1917.

To show the economic advantages presented by the tractor, the writer has made this comparison between the costs of keeping horses and a tractor of equal power.

The cost of upkeep of a horse varies very widely. Of late years, the expense has continually increased owing to the higher cost of hay, oats, and labour.

According to the official estimates of the United States Agricultural Department, the cost of upkeep of a horse that was about 80 dollars a few years ago, had increased to 98 dollars in 1912 and to 129 in 1914. In 1916, the writer reckons the cost to be 167 dollars. Thus the cost of upkeep of a

horse has doubled in the last 15 years; in calculating it, the writer has taken into account the interest on capital, depreciation of the animal and harness, food, attendance and shoeing. A ration of 4600 pounds of grain and 6300 pounds of hay per horse per year has been taken as a basis, being figures obtained in an investigation in Minnesota.

On an average 160-acre farm, at least 4 horses are required; the maintenance charge for these horses would be \$668.76.

For an 8HP tractor costing \$1000, the maintenance charges are:

Interest on investment at 6%	\$ 60	
Depreciation and repairs at 20%	200	
20 gallons of kerosene at 7.7 cents per gallon	0.54	
1 gallon of oil at 35 cents per gallon	0.35	
therefore for 100 working days	189.00	per 10 hours work
Labour and miscellaneous expenses (not including driver's wages)	19.87	
Total	468.87	

It is seen that the maintenance of an 8HP tractor costs 200 dollars less than that of 4 horses, which cost about 250 dollars each in the United States. Therefore the cost price is the same in both cases.

As regards the comparative cost of a day's work, some official estimates show that a farm horse works from 700 to 1000 hours a year. Taking the most favourable figure, a horse costs 16.7 cents for each hour of work, the annual cost being \$167.19.

A 160 acre farm, which is taken as the economical minimum of size for tractor employment, requires 4 horses for the work; therefore the cost per hour of horse labour amounts to 66.8 cents.

The tractor maintained at an expense of \$468.87 for the year, also will work 1000 hours, at a cost of 46.8 cents per hour, or as it is 8HP, it will cost per horse power only 5.8 cents. This is an advantage in favour of the tractor of nearly 11 cents per horse power hour. In fixing the rate of depreciation the writer reckons it at 20% of the cost price, for he thinks that the life of a tractor is very limited, whilst he values the depreciation in value of the horses at only 10%.

357—The Dowling Plough.—*Scientific American*, Vol. CXVI, No. 2, p. 68. New York, Jan. 13, 1917.

This plough invented by J. DOWLING, Powell, Wyoming, U.S.A., has a pair of ploughshares placed back to back on the plough standard and a beam adapted to be turned through an angle to present either of the said ploughshares at the front. The ploughshares are separately mounted on the plough standard for vertical sliding movement and there are means for simultaneously sliding the ploughshares in opposite direction to raise either share and

depress the other to working position on the standard.

475—The Ransome Three-Row Ridger.—*The Implement and Machinery Review*, Vol. 42, No. 503, p. 1238 + 1 fig. London, March 1, 1917.

MESSRS. RANSOMES, SIMS & JEFFRIES, of Ipswich, produce a three-row ridger for potato growers who do not favour the use of a combined cultivator and ridger.

358—Bates-Joliet Tractor with Extensible Steering.—FREMIER, VICTOR, in *Le Génie Rural*, Year 8, New Series No.6 (No. 66), p. 10, 3 fig. Paris, 1916.

The JOLIET OIL TRACTOR COMPANY has fitted an extensible steering wheel in the rear of its tractors, so as to allow the driver to be seated behind the plough or binder and at the same time to drive the tractor and control the implements being hauled.

360—The "Marvel" Potato Digger.—*The Implement and Machinery Review*, Vol. 42, No. 502, p. 1132, 1 fig. London, February 1, 1917.

365—Hygienic Drinking Trough with Separate Compartments.—*Scientific American*, Vol. CXVI, No. 2, p. 66 + 1 fig. New York, Jan. 13, 1917.

To prevent the spread of disease, particularly glanders, among horses, a drinking trough has been invented in the United States which prevents the horses from all drinking in the same water.

The trough contains several basins, just large enough to admit the muzzle of each horse, and in which the water enters from the bottom and flows away over the upper edge. Thus, there is a continuous stream of water which flows away by the waste pipes.

AGRICULTURAL INDUSTRIES

- 481—The Potato Starch Industry in Holland.—GOOSEN, G., in *In-en Uitvoer*, No. 9, pp. 190-192. Amsterdam, Feb., 28, 1917.
- 482—The Commercial Use of Saccharose-Inverting Bacteria for the Manufacture of Lactic Acid, Acetic Acid and Acetone.—MEZZADROLI, G., (Preliminary note), in *Bollettino dell'Associazione delle Industrie dello Zucchero e dell'Alcool*, Year IX, No. 10, pp. 142-145. Bologna, January, 1917. (2 pp. in Institute Bulletin).
- 369—Sugar Sorghum and Alcohol in War Time, in France.—POUZIN, PAUL, in *Journal d'Agriculture pratique*, Year 81, New Series, Vol. 30, No. 4, pp. 67-68. Paris, February 22, 1917.
- 488—"Grana" Cheese Attacked by *Penicillium Roqueforti* at the Cheese Making Station at Lodi, Italy.—DALLA TORRE, G., in the *Annuario della R. Stazione Sperimentale di Caseificio di Lodi*, Year 1915, pp. 20-22. Lodi, 1916.
- 372—General Data on Cheese Manufactured at the Lodi Royal Experimental Station (Italy) during the Year 1915-1916.—BESANA, C. in *Annuario della R. Stazione Sperimentale di Caseificio di Lodi*, pp. 11-14. Lodi, 1916. (2 pp. in Institute Bulletin).
- 373—The Drying of Cereal Grains in Germany.—STEFELD RICHARD in *Die Muhle* 53rd Year, No. 45, pp. 739-740, 2 figs. Leipzig, Nov. 10, 1916. (3 pp. in Institute Bulletin).
- 374—Recent Data on the Potato Drying Industry in Austria.—WIRTH in *Wiener Landwirtschaftliche Zeitung*, 67th Year, No. 8, pp. 51-55; No. 9, pp. 59-61. Vienna, 27th and 31st Jan., 1917.
- Whereas in Germany the practice of drying potatoes had already acquired great importance before the war, it is only during the course of the same that its value has been realized in Austria. At the present moment this country possesses 80 potato driers, of which 41 were set up in 1916, in 22 new drying establishments.
- 375—Use of Flowers of Sulphur for Preserving Potatoes (1).—*Bulletin de la Société des Agriculteurs de France*, Vol. LXXIX, pp. 10-11. Paris, January, 1917.
- The Director of the Agricultural Colony of Lamotte-Beuvron, France, has for a long time past obtained excellent results by dusting potatoes with sulphur in proportion as they are stored in the silo or cellar.
- Reddish or pink potatoes lose a little of their colour but retain their germinating faculty and acquire no taste of sulphur. As a result of the heat produced at the beginning of heaping the sulphur becomes transformed into sulphurous anhydride which spreads throughout the silo or store and destroys the latent germs of rot, especially those at the surface of the tubers.
- This method is used by the Director with equal success for the preservation of accumulated stocks.
- (1) See also Bulletin of Foreign Agricultural Intelligence, Nov., 1915, No. 752.
- 376—New Process for Preserving Butter over Long Periods.—PAUL T., in *Chemiker-Zeitung* Year 41, No. 10, pp. 74-75. Cothen, Jan. 24, 1917. (2 pp. in Institute Bulletin).
- The writer already showed some time ago the possibility of preserving butter from deterioration for long periods by proceeding in the following way: separating the fatty matter of the butter from the remaining buttermilk, keeping it in tightly closed recipients and reconverting into butter when required for consumption by treating it with fresh milk. He has now attempted to convert this possibility into practice and has carried out trials which, having given very satisfactory results, have led to the adoption of methods described in the article in the Institute Bulletin.

PLANT DISEASES

- 491—Toxic Chlorosis of Maize. The Internal Secretion and Natural Resistance of Higher Plants to Poisons and to Parasitic Diseases (1).—MAZA, P., in *Comptes rendus des séances de la Société de Biologie*, Vol. LXXIX, No. 19, pp. 1059-1066. Paris, 1916. (3 pp. in Institute Bulletin)
- (1) See also Bulletin of Foreign Agricultural Intelligence, June, 1915, No. 226.
- 381—Observations on Plant Diseases carried out in 1915 at the Royal Institute of Cryptogamic Botany (Cryptogamic Laboratory) of Pavia, Italy.—BRIOSI, GIOVANNI, in *Bollettino dei Ministeri per l'Agricoltura e per l'Industria, il Commercio ed il Lavoro*, Series B., Year XV, Vol. II, Part 5-8, pp. 17-26. Rome, 1916
- 497—Acid and Alkaline Spraying Mixtures.—HÉRON, G., in *Le Progrès agricole et viticole*, 34th Year, Vol. LXVII, No. 10, pp. 228-230. Montpellier, Mar. 11, 1917.

With reference to a communication by Messrs. VERMOREL and DANTONY to the French Academy of Agriculture on the preparation of copper mixtures for the control of "mildew", whence it appears that acid spraying mixtures are inferior to alkaline mixtures, the writer—President of the Agricultural Syndicate of the Haute-Garonne—states his personal ideas upon this important subject.

Messrs. VERMOREL and DANTONY say that acid or neutral mixtures are carried off by rain and atmospheric agents with extreme rapidity, whilst alkaline mixtures resist much better and remain active for months, giving up after this time a fair quantity of copper to the water of the atmosphere, whence the conclusion that an alkaline mixture with 1% sulphate of copper would be superior to a 2% spray, when it is acid. The writer draws attention to the fact that the acid mixture is a mixture which contains the same quantity of lime per hectolitre, in a copper preparation, as does an alkaline mixture to which is added the quantity of copper necessary to render it acid from the point of view of its physical composition, therefore, it is just as thick.

The writer states that, if the soluble copper is removed by the rain, it would be the same thing from the point of view of the vine as if no excess of copper had been added, consequently the writer is at a loss to understand why this preparation should cease to be active. He states he has obtained good results from acid preparations.

He questions whether the copper, whose disappearance was remarked by Messrs. Vermorel and Dantony had not been partially absorbed by the leaves, thus conferring upon them a certain immunity.

It would be interesting to study this phenomenon and, at the same time, enquire whether it would not be possible to protect vines against fungoid parasites by injecting an immunising solution into the sap.

The writer concludes that: 1) thorough spraying with copper mixtures is more important than ever and that such spraying should extend to all the green portions of the plant; 2) in the present state of our knowledge it would be very dangerous, in a year favourable to "mildew", to reduce the quantity of copper.

498—Lime-Sulphur Mixtures in the Control of the "Oidium" of the Vine.—CADORET, ARTHUR, in *Le Progrès agricole et viticole*, 34th Year, Vol. LXVI, No. 11, pp. 258-259. Montpellier, 1917.

503—*Ascochyta* sp. the Cause of a Disease of Cabbages, in Germany.—VASTERS, JOSEF, in *Deutsche landwirtschaftliche Presse*, 43rd Year, No. 35, pp. 308-309. Berlin, 1916.

505—Diseases and Pests of the Common Spruce (*Picea excelsa*) in Darnaway Forest, Scotland.—WATSON, H., in *Transactions of the Royal Scottish Arboricultural Society*, Vol. XXXI, Part 1, pp. 72-73, Edinburgh, 1917.

INJURIOUS INSECTS

508—Observations on the Life History of *Agriotes obscurus*, Linn.—FORD, GEORGE H., in *The Annals of Applied Biology*, Vol. III, Nos. 2 and 3, pp. 97-115, 2 plates, Cambridge, January, 1917.

393 *Wolffella ruforum* n. gen. and n. sp., a Chalcid Parasite of the Eggs of *Lophyrus rufus* in Germany.—KRAUSSE ANTON, in *Zeitschrift für Forst und Jagd-*

wesen, Year 49, Part 1, pp. 26-35. Berlin January, 1917.

394—The Solubility of the Scale of the Mussel Scale-Insect (*Lepidosaphes Ulmi*, Linn).—MAULIK, S., in *Bulletin of Entomological Research*, Vol. 7, Part 3, pp. 267-269, fig. 1. London, 1917. (2 pp. in Institute Bulletin).

INJURIOUS VERTEBRATES

396—The Control of Field Voles in Italy.—SPLENDORE, ALEONSO, in *Rendiconti delle sedute della Reale Accademia dei Lincei, Classe di Scienze fisiche, matematiche e naturali*, Series 5, 2nd. Half year, 1916: Vol. XXV, Part 6, pp. 218-224, and Part 12, pp. 510-512. Rome, 1916. (3 pp. in Institute Bulletin).

516—The Squirrel as an Enemy of Forest

Plants and of Birds.—D'ANNE, in *Bulletin de la Ligue française pour la protection des oiseaux*.—Abstracted in the *Revue des eaux et forêts*, 5th Series, 15th Year, Vol. IV, No. 1, p. 27. Paris, Jan. 1, 1917.

M. d'Anne has made out a most damaging case against the squirrel. He concludes from his observations that these

rodents are great destroyers of birds. He has seen them disturbing birds while building their nests, destroying and knocking down the finished nests, chasing both laying and sitting birds, breaking eggs, killing the young. They attack not only the small *Passeres* but also jays, magpies and hawks (those of more combative temperament, however). They steal the food of pheasants and even visit dove-cots and the poultry yards. In the Somme, where squirrels were unknown or rare, birds were very numerous up to recent years but with

the advent of these rodents the birds diminished in number and have now nearly disappeared. If one adds to all these misdeeds the fact that the squirrel attacks both deciduous, especially the poplar, and coniferous trees, one cannot do better than support the recommendation made to the Society of French agriculturists that the squirrel be regarded as a pest and its destruction encompassed by landowners and farmers upon their lands, at all times, even by the use of guns.

AGRICULTURAL ECONOMICS

THE ACTIVITY OF THE BELGIAN "BOERENBOND" IN 1915

The powerful organism constituted by the Peasants' League has not interrupted its labours during the German occupation, as we will prove, rapidly sketching its work in 1915.

Speaking generally it is true that everything founded by the *Boerenbond* before the war has survived, and moreover new plans have been realized. Thus the general secretary's report notes the organization of two new agricultural gilds, one in the province of Antwerp, two in Brabant and one in East Flanders. Means of communication had hardly been re-established, in the last months of 1914, when the league's inspectors began once more to travel about the country in order to visit the rural associations and to co-operate, in the words of the report, "in reviving social and economic life in the rural districts". They were entrusted at the same time with the additional duty of collecting information and noting the most urgent needs in order to enable a directing committee to organize committees for relief and nourishment everywhere. Further as soon as it was possible the *Boerenbond*, in agreement with some influential personages in the agricultural world, undertook the defence of the interests of tillers of the soil and participated in the formation of an agricultural section of the national committee for relief and nourishment which came into being at the end of December 1914. Two of its administrators are members of this section and have taken a large part in all its work. The co-operative society, *Agricultural Assistance*, which aims at buying food for live stock and all supplies indispensable to agriculture, was founded towards the end of February, and a delegate of the *Boerenbond* is on its administrative council.

"It was not however enough to create an agricultural section for the whole country: it was necessary also to consider agricultural interests in the different provinces.

The want was best supplied by founding in each of them an agricultural sub-section, having an autonomous existence. This was done in the provinces of Brabant, Antwerp and Limbourg among others. The *Boerenbond* had its share in the formation of these three sections, within which it is represented by its delegates".

Until the *Agricultural Assistance* should be able to maintain agriculture with food-stuffs, manures and primary material of every kind, the *Boerenbond* itself undertook to fulfil this task and to reduce to the minimum the difficulties which the agricultural world had to meet.

"The *Boerenbond* or more accurately its counter for sale and purchase—bought in the first place, for the provinces of Antwerp and Brabant, the food for live stock which the German civil administration granted, at the first distribution, to agriculture in these two provinces, and remitted the food to the agricultural sections. Had there been opportunity it would have been equally zealous to render this service to the other provinces. Soon afterwards it took over from the German civil administration a sufficiently important quantity of oilcakes of which it afterwards made grants in accordance with the instructions of the national agricultural section.

"In agreement with the latter it made a bargain with the *Drogueries et Huileries anversoises* for 2,500 tons of arachis and sesamum oilcakes which were distributed among all the provinces, but did not reach their destination until long afterwards because part of the merchandise was being manufactured at the time of purchase and because the formalities required for its liberation were retarded.

"Hitherto no concentrated food whatever had crossed the frontier. Moved by the distress of agriculture the *Boerenbond* did everything possible to remedy the situation. In the course of February it was

at its own request commissioned by the *Agricultural Assistance* to send a delegate to Holland to treat for the purchase and importation of 4,000 tons of oilcakes. This was a delicate mission but after many difficulties it was satisfactorily concluded.

"These were the only edible oilcakes imported in 1915 in addition to the unimportant quantity bought in Holland in December 1914 by the representatives of the *Boerenbond*".

Thanks to these efforts Belgian agriculturists were more or less provided with various products with which to meet the difficulties in the way of feeding the live stock. The *Boerenbond* then turned its attention to procuring manures.

As early as the spring of 1915 all chemical manures had been seized by the German administration. The *Boerenbond* negotiated and obtained for its members some tons of superphosphates and guano and small quantities of scoria.

It was however even more difficult to encounter the consequences of the seizure of harvests. The *Boerenbond* gave every care to regulating this matter in the best interests of its members.

"As early as the first fortnight of July the *Boerenbond* had occasion to formulate its desires to the German civil administration. It proposed tariffs in harmony with the general situation, giving prices at which the cultivators should themselves buy the goods they needed, and it asked that they should be allowed to retain such quantities of grain as were reasonably necessary for household and farming purposes. In this way it claimed 2200 lb. of oats for each horse, and in this at least obtained satisfaction since the decree ordered an allowance of two and a half kilogrammes a day or 2024 lb. in all. Later this quantity was notably diminished.

"For the rest, the allowance of rye for every head of horned cattle was, as is known, fixed at 16½ lb. a month or a total of 198 lb.—an entirely insufficient amount.

"As regards food for the people the allowance of wheat was 340 grammes (.68 lb.) a day for each person, but producers of rye might retain only a third of this amount of rye, being allowed to buy the other two-thirds of their ration in wheat from the committees.

"The authorization to reserve 198 lb. rye for a head of cattle was a concession, however slight; that of utilizing this quantity at pleasure, instead of being obliged to keep one-twelfth for every month until the next harvest, was another; and finally producers of rye were allowed to take out two-thirds of their ration in rye. In spite of our most persistent efforts it was impossible to obtain more.

"Although here again results have not been equal to expectation we cannot regret having done our duty. Our gilds, which

have seen their efforts partially fail on some occasions, should also argue thus, and should rejoice with us in the least success. The position of our cultivators would, without our and their intervention, have been far worse in many respects."

Thus new difficulties, affecting agriculture and the rural population, arose at every moment. The regulation of the sale of potatoes, the acquisition of seeds and plants, the struggle against the unreasonably audacious adulteration of foods for live stock and of manures, the efforts to obtain subsidies for the reinsurance of cattle and horses, the intervention of unemployment funds in favour of unemployed workpeople—these and others were so many problems which the *Boerenbond* attempted to solve, multiplying all the necessary procedure in relation to the civil and the military authorities. Not the least arduous task was that of helping small cultivators in the districts which have suffered most from the war. To estimate damages, to combat the discouragement of the poor peasants whom the war had ruined, to draw up plans for bringing lands under cultivation and resuming the tith of abandoned lands, to organise a system of small loans which would particularly favour those most tried, to collaborate in fact in every possible way in the resumption of work and life on this countryside ravaged by the war—this has been the essential aim which the various sections and the directing committee have laboriously pursued. No consideration, including regard for hygiene, has failed to influence the association's conduct and to contribute to the efforts to reconstruct destroyed villages and farms.

"We have made a point," says the report, "of rendering yet another service to the country people who were obliged to reconstruct their houses or farms. We wished to make them understand that in building it is easy for them to observe the rules of comfort and primary notions of hygiene without any consequent increase of expense. There are already in the country too many insanitary dwellings and too many farms constructed in defiance of the rules of good sense.

So much as to the league's general activity. As regards the particular activity of each of the organisms within its framework, this has been no less fruitful; and we wish we could mention all that has been accomplished by the parochial gilds, the farmwives' circles, the federations of horticulturists, the counter for sale and purchase, the inspectorate of milk, the central credit fund and the insurance section.

One of the association's most active branches has been indisputably the *Central Credit Fund*.

The year 1915 was, says the report, one of the most important years it has had

since its formation. Not only was the number of affiliated local funds increased by forty-four but the savings deposits were more numerous than ever and hundreds of small loans were made to cultivators in needy circumstances.

"This considerable increase in the amount of savings deposits in the second year of the war is partly explained by the fact that cultivators have had partially to realize their invested capital. It was impossible for them to procure the desired quantities of manures for their fields and of concentrated food for their live stock. Thanks to the reserves of fertilizing substances preserved in the soil they had generally very satisfactory harvests, and therefore had

more liquid cash in hand than usual, but this was to the detriment of the wealth of the soil. They fed their live stock as they could, having no choice but to avoid the expense of purchasing the concentrated foods usually on the market; but the value of their stock was diminished in consequence, and the animals of which they got rid were seldom nor never replaced.

The various insurance and mutual aid organizations continued to do business represented by a very respectable figure. Fire and life insurance and insurance against hail and mortality among live stock perceptibly increased the number of their policies, the amount of the premiums they received and the capital they insured.

THE AMERICAN SOCIETY OF EQUITY

Founded in 1902 at Indianapolis, Indiana, the American Society of Equity is one of a number of kindred bodies working in the central and north-western states for better organization among farmers. From 1902 to 1911 it had tremendous ups and downs—a series of successes and failures.

Its growth has been very rapid in the last four years. The membership is now 100,000. It has 7,146 local unions and is operating in fourteen states Kentucky, Indiana, Illinois, Wisconsin, Iowa, Minnesota, North Dakota, South Dakota, Nebraska, Wyoming, Montana, Oregon, Washington and Idaho—and has scattered members in other places.

Under the rules of this society a county union comprises five local unions and a state union a minimum of five county unions and 500 members.

So far the work of the American Society of Equity has been mainly educative and has been carried on through meetings of local unions, literature, organizers or other-

wise, much as is the educative work of the Grain Growers' Associations in Western Canada. This side of the enterprise seems indeed to have overshadowed its business side, for until the last two years little was done to develop the business organization.

A little more than a year ago the central organization established the American Co-operative Association which is the business organization of the American Society of Equity. It is organized under the Wisconsin State laws. It has already established several branches and transacted a large amount of business. Its first enterprise was to publish *The Organized Farmer* of which the first issue appeared on January 14th, 1915.

The large business that has developed has secured for the association the very lowest possible prices and enabled it to sell to its members approximately at the prices charged by wholesalers to retailers. The quality of the goods is guaranteed, the customer being under no obligation to accept them if the quality be not good.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the May number of the International Review of Agricultural Economics. Persons interested in any of the articles in this list may obtain the original bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted.

	Page
The activity of the Royal Society of Danish Agriculture in 1915-17	9-14
The Agricultural Organization Society in England and Wales	15-24
Municipal Insurance against Hail in Saskatchewan	37-48
Agricultural Credit in Roumania	49-62
Land Tenure and the Organization of Agriculture on Indian Reservations in the United States	63-76
Agricultural Labour in Ireland and the Migration of Irish Agricultural Labourers	77-81
Conditions of Life and Work Among the Forests of Sweden	82-95

AGRICULTURAL STATISTICS

THE CROPS OF 1917

The following tables contain the official estimates of the production of cereals in the countries which have reported to the Institute:

Countries	1917	1916	Five years' average 1911-15
Wheat—	Busbels	Busbels	Busbels
Spain	141,000,000	152,330,000	125,214,000
France	145,074,000	214,622,000	296,304,000
Ireland	4,347,000	2,827,000	1,834,000
Italy	140,000,000	176,531,000	182,604,000
Netherlands	3,453,000	4,710,000	5,729,000
Sweden	7,497,000	8,979,000	8,610,000
Canada	231,730,000	(a) 262,781,000	254,965,000
United States	659,797,000	639,886,000	806,361,000
India	379,307,000	318,005,000	360,550,000
Japan	26,533,000	28,307,000	24,638,000
Algeria	28,980,000	29,152,000	35,000,000
Totals	1,767,718,000	1,838,130,000	2,101,809,000
Rye—			
Spain	24,366,000	28,782,000	25,147,000
France	27,534,000	35,889,000	44,517,000
Ireland	222,000	192,000	228,000
Italy	4,460,000	5,342,000	15,159,000
Netherlands	11,956,000	11,471,000	15,501,000
Sweden	15,748,000	22,929,000	24,220,000
Canada	4,240,000	(a) 2,876,000	2,326,000
United States	56,044,000	47,383,000	41,399,000
Totals	144,570,000	154,864,000	158,497,000
Barley—			
Spain	76,748,000	86,864,000	74,119,000
France	11,249,000	39,405,000	44,599,000
Ireland	7,872,000	6,537,000	7,264,000
Italy	7,427,000	10,109,000	9,611,000
Netherlands	2,571,000	2,372,000	3,257,000
Sweden	12,264,000	14,621,000	14,492,000
Canada	51,684,000	(a) 42,770,000	47,805,000
United States	201,659,000	180,927,000	197,211,000
Algeria	32,829,000	35,970,000	39,050,000
Totals	434,303,000	419,575,000	437,808,000
Oats—			
Spain	31,104,000	30,272,000	28,311,000
France	223,467,000	267,664,000	304,618,000
Ireland	79,164,000	58,685,000	61,000,000
Italy	31,897,000	24,543,000	32,192,000
Netherlands	17,502,000	18,841,000	19,552,000
Sweden	66,594,000	87,614,000	72,536,000
Canada	393,570,000	(a) 410,211,000	399,644,000
United States	1,680,714,000	1,251,992,000	1,230,499,000
Algeria	17,182,000	12,367,000	12,014,000
Totals	2,441,494,000	2,162,189,000	2,160,366,000
Corn—			
Spain	25,738,000	28,642,000	27,672,000
Switzerland	252,000	152,000	118,000
Canada	6,193,000	(a) 6,282,000	16,240,000
United States	3,210,795,000	2,583,241,000	2,754,164,000
Totals	3,242,978,000	2,618,317,000	2,798,194,000

(a) The 1916 figures for Canada have been revised in accordance with the report of the census of the prairie provinces.

UNITED STATES OCTOBER CROP REPORT

The estimates of production in the United States of crops, other than those given in the above table, are as follows:

	October 1, 1917 indications	December, 1916 estimates	1911-1915 5-year average
Buckwheat, bus.	17,895,000	11,840,000	16,514,000
White potatoes, bus	452,923,000	285,437,000	362,910,000
Sweet potatoes, bus	87,244,000	70,955,000	60,257,000
Flax, bus	11,335,000	15,459,000	18,615,000
Rice, bus	33,256,000	40,702,000	25,266,000
Tobacco, lbs	1,243,023,000	1,150,622,000	983,723,000
Cotton, bales	12,047,000	11,450,000	14,176,000
Peaches, bus	42,606,000	36,939,000	49,027,000
Pears, bus.	10,848,000	10,377,000	11,341,000
Apples, total crop, bus	176,620,000	202,245,000	215,572,000
Apples, commercial, barrels	21,192,000	25,695,000	
Hay, tame, tons.	76,490,000	89,991,000	69,543,000
Hay, wild, tons	15,225,000	19,795,000	17,044,000
Hay, total, tons	91,715,000	109,786,000	86,587,000
Sugar beets, tons	7,832,000	6,228,000	
Kafirs, bus	98,609,000	50,340,000	
Beans, commercial, bus	15,814,000	8,846,000	
Onions, fall crop, commercial, bus	13,554,000	7,833,000	
Cabbages, commercial, tons	692,000	252,000	

BROOMHALL'S FOREIGN CROP REPORT SUMMARY, OCT. 23, 1917

Russia.—Weather unfavourable, cool and wet. This is against the movement and also autumn sowing, and it is believed that the acreage will be small, as labour is scarce and seed of inferior quality. Agriculturists are discouraged owing to the poor marketing of the last yield.

France.—Weather continues wet and cool and threshing and movement is light. Prices remain high and mills are operating slowly. Agriculture is slow. Foreign arrivals are increasing and importation is important and will continue on an increased scale. America is favoured owing to the shortness of transit and also grading.

Italy.—Weather is against agriculture. Threshing has revealed a very moderate yield. Stocks of foreign wheat are light and native grain is moving slowly. There is great unrest regarding the food question. Foreign needs are large.

Spain.—Wheat is housed and the quality fine, with the yield exceptionally good. Foreign purchases are authorized to

maintain reserves.

Balkan States.—Weather is very favourable for agriculture, being moist and warm. Harvesting is reported as being very favourable, with yield and quality good. Stocks are good and exportation overland to the Central Powers continues.

Scandinavian Countries.—Harvesting is finished. Yield and quality poor. Stocks are light and foreign arrivals are small and mostly from America. Food question is very discouraging.

United Kingdom.—Weather is mild and wet. Crops yielded unfavourably, with the quality fair. Foreign supplies are liberal and recent purchases in importing centres liberal.

South Africa.—The corn yield is not up to expectations and harvesting is disappointing. Late frost occurred and ravages of pest were bad in some localities.

Australia.—Weather favourable and crops prospering. Estimates of yield are being raised.

EXPORTS OF MEATS AND ANIMAL PRODUCTS FROM ARGENTINA

Products	1917 1st 3 months	1916 1st 3 months	Year 1916	Year 1915	Year 1914	Year 1913
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Mutton	25,567,000	25,340,000	113,137,000	77,250,000	129,385,000	101,254,000
Beef	206,804,000	212,971,000	942,916,000	799,702,000	813,434,000	807,396,000
Pork	795,000	372,000	2,965,000	1,969,000		
Preserved meat	30,832,000	15,311,000	98,258,000	70,424,000	28,852,000	27,721,000
Salted meat	10,355,000					
Smoked meat	194,000	68,000	2,467,000	469,000	5,240,000	8,620,000
Wool	127,438,000	86,051,000	267,991,000	259,415,000	258,536,000	264,731,000
Sheepskins	7,048,000	5,029,000	36,041,000	47,313,000	32,082,000	44,366,000
Ox hides	53,680,000	42,038,000	219,117,000	198,034,000	172,104,000	191,745,000
Goatskins	1,453,000	1,000,000	7,083,000	5,545,000	3,598,000	5,381,000
Horse hides	3,164,000	1,228,000	8,708,000	5,617,000	3,073,000	2,608,000
Butter	5,002,000	6,261,000	12,502,000	10,192,000	7,676,000	8,342,000
Fat and Tallow	27,999,000	21,821,000	107,332,000	109,936,000	112,929,000	139,087,000

The number of live stock in Argentina in 1913 were: Cattle 30,796,447, horses 9,366,455, sheep 81,485,149, goats 4,663,808, pigs 3,197,337.

EXPORTS OF CHILLED AND FROZEN MEAT FROM BRAZIL

Destination	1917 First 4 months	1916 First 4 months	Year 1916	Year 1915
	Pounds	Pounds	Pounds	Pounds
United States.	200,000	2,435,000	5,481,000	2,168,000
France . . .		5,447,000	9,800,000	210,000
Great Britain	1,995,000	4,455,000	11,961,000	7,889,000
Italy . . .	49,740,000	1,394,000	33,517,000	4,451,000
Gibraltar for orders			10,659,000	
	51,935,000	13,731,000	71,418,000	14,718,000

The number of live stock in Brazil in 1916 were: Cattle 28,962,180; Pigs 17,329,210; Goats 6,919,550; Sheep 7,204,920.

EXPORTS OF MEAT AND ANIMAL PRODUCTS FROM AUSTRALIA

Products	First four months		Year	1914-15	1913-14	1912-13	1911-12
	1916-17	1915-16	1915-16				
	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds	Pounds
Beef	147,200,000	76,148,000	114,675,000	292,065,000			
Mutton and lamb.	60,309,000	36,923,000	38,343,000	193,263,000	204,930,000	115,371,000	129,568,000
Preserved meat	11,556,000	12,101,000	14,266,000	57,773,000			
Butter	56,750,000	12,298,000	16,722,000	54,021,000	75,795,000	66,679,000	101,721,000
Greasy wool	231,300,000	335,636,000	408,620,000	443,951,000	531,431,000	557,825,000	578,820,000
Scoured wool	40,906,000	57,108,000	79,882,000	64,949,000	64,450,000	63,253,000	71,770,000

Number of live stock in Australia in 1915: cattle 9,925,150, sheep 69,272,460

EXPORTS OF FROZEN MEAT AND ANIMAL PRODUCTS FROM NEW ZEALAND

Meat	Year ending May 31, 1917	Year ending May 31, 1916	Animal products	Year ending May 31, 1917	Year ending May 31, 1916
	Pounds	Pounds		Pounds	Pounds
Beef	104,037,000	102,340,000	Wool	154,329,000	184,481,000
Mutton	142,943,000	153,943,000	Hides (number)	1:0,567	300,225
Lamb	85,644,000	122,797,000	Sheepskins (in the wool)..	1,429,000	3,070,000
Mutton and lamb in quarters	846,000	3,611,000	Sheepskins (shorn)	17,679,000	23,249,000
			Butter	39,809,000	45,010,000
			Cheese	100,080,000	109,062,000
			Tallow	49,105,000	46,648,000

Number of live stock in New Zealand in 1916: cattle 2,387,036, sheep 24,788,150, pigs 292,115.

LIVE STOCK STATISTICS

Numbers of live stock in the Netherlands, Norway and Canada:

Classification	April 11, '17	June, 1913
Netherlands		
Cattle	2,301,007	2,096,599
Sheep	520,810	842,018
Pigs	1,185,565	1,350,204
Norway.	Sept. 30, '16	Sept. 30, '15
Horses	189,175	186,217
Cattle	1,119,306	1,120,517
Sheep	1,281,030	1,329,559
Goats	230,055	240,303
Pigs	221,217	208,522

THE GAZETTE the following revised figures for the number of live stock in Canada in 1916 and 1917 should be noted. The revision has been made in accordance with the report of the census of the Prairie Provinces, and the improved methods of collecting statistics in Quebec, Alberta, Saskatchewan and British Columbia:

Canada:	1917	1916
Horses	3,412,749	3,258,342
Milch cows	3,202,223	2,833,433
Other cattle	4,718,657	3,770,718
Sheep	2,369,358	2,022,941
Swine	3,619,382	3,474,840

Referring to the live stock statistics given at page 436 of the May number of

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Vol. 4, No. 12



December, 1917

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE

The Agricultural Gazette of Canada

EDITOR · J. B. SPENCER, B.S.A.

Issued by direction of
THE HON. THOS. ALEXANDER CRERAR
Minister of Agriculture

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CONTENTS

	PAGE
Service Without Sacrifice.. . . .	1031

PART I

DOMINION DEPARTMENT OF AGRICULTURE

Government Exhibition Work:—	
The Wool Exhibit of the Live Stock Branch, by T. Reg. Arkell...	1032
The Egg Exhibit of the Live Stock Branch, by Ernest Rhoades.	1035
The Experimental Farms Exhibit, by W. A. Lang	1036
The Dominion Experimental Farms:—	
The Division of Horticulture:	
Experiments with Potato Seed, by W. T. Macoun	1039
Dominion Horticulturist Elected to Important Offices	1042
Canadian Maples for our Soldiers' Graves in France	1042
The Health of Animals Branch:—	
The Chief Pathologist Resigns	1042
The Entomological Branch:—	
The False Tussock Caterpillars on Shade Trees, by J. M. Swaine.	1043
The Live Stock Branch:—	
The Live Stock Commissioner	1047
The Pork Production Campaign	1048
Meeting of Western Province Representatives	1048
The Department Honour Roll.	1048

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

Provincial Exhibition Work:—	
Nova Scotia, by M. Cumming	1049
Chemistry Exhibit of the Agricultural College	1049
The Farm Department, by John M. Trueman	1050
Quebec:	
The Teaching Value of Fairs, by H. Nagant	1050
Ontario:	
The Province's Agricultural Exhibit at the Canadian National Exhibition, by C. F. Bailey	1053
Manitoba:	
Seed Grain Fairs and Dressed Poultry Shows	1054
Saskatchewan:	
At the International Soil-Products Exposition	1055
Experiments with Potato Seed:—	
Quebec:	
Macdonald College, by T. G. Bunting	1056
Ontario, by Dr. C. A. Zavitz	1056
Manitoba, by James A. Neilson	1057
Quebec:—	
The Study of Veterinary Science, by Chas. H. Higgins	1058
Ontario:—	
The Winter Feeding of Lambs, by J. P. Sackville	1060
Specialists Meet to Discuss Potato Situation, by Justus Miller.	1061
Better Farming Special	1065
District Representative Activities:	
Ploughing Competitions	1066
The Paying of School Fair Prizes.	1066
A School Fair Parade.	1066
Ten Lessons in Agriculture.	1066
Visits for Consultation	1067
Poultry Association Formed.	1067
Organizing for Short Courses, by J. W. Stark	1067
Marketing Hogs Co-operatively, by Walter H. Smith.	1068
Sale of Agricultural College Live Stock.	1069
Manitoba:—	
The Value of Sweet Clover as a Feed.	1070
Short Courses in Farm Engineering.	1071

Saskatchewan:—	PAGE
The Legislature Approves Hog Production Campaign	1071
Sale of Wool	1071
The Year's Potato Crop	1072
Live Stock Commissioner Fallen in Action	1072

PART III RURAL SCIENCE

School Gardens and Greater Production:—	
Nova Scotia, by L. A. DeWolfe	1073
New Brunswick, by R. P. Steeves	1073
Ontario, by J. B. Dandeno	1075
Manitoba, by R. Fletcher	1076
Saskatchewan, by A. W. Cocks	1077
Northern Saskatchewan, by Fred W. Bates	1078
Manitoba:—	
Boys' and Girls' Clubs, by J. H. Kiteley	1079

PART IV SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS, NOTES AND PUBLICATIONS

Vacant Lot Gardening:—	
A Consideration of Method and Accomplishment in the Cities of the Dominion	1083
Acts Relating to Agriculture:—	
Drainage in All its Phases	1097
Student Enrolment, 1917-18	1104
Association of American Agricultural College and Experimental Stations	1105
Associations and Societies:—	
New Brunswick Women's Institute	1106
Ontario Horticultural Association	1106
Quebec Stock Breeders' Association	1107
United Farmers of Ontario	1107
Western Canada Live Stock Union	1107
A "Guide" Seed Fair	1108
Agricultural Relief of the Allies Committee	1108
The Saskatchewan Live Stock Associations	1108
Saskatchewan Dairymen's Convention	1109
Alberta Cattle Breeders' Sale	1109
Alberta Sheep Breeders' Sale	1109
Alberta Sheep and Swine Breeders' Sale	1109
British Columbia Women's Institute Conferences	1110
Canadian Brown Swiss Association	1110
The Potato Association of America	1110
New Publications	1110
Notes	1112
Index to Periodical Literature	1114

PART V THE INTERNATIONAL INSTITUTE OF AGRICULTURE

Foreign Agricultural Intelligence	1115
Science and Practice of Agriculture	1116
Crops and Cultivation	1116
Live Stock and Breeding	1117
Farm Engineering	1120
Rural Economics	1121
Agricultural Industries	1123
Plant Diseases	1124
Agricultural Economics:	
Regulation of the Fruit Trade in the United States	1125
Contents of the Institute Economic Bulletin	1128
Agricultural Statistics:	
Institute Crop Cable	1129
United States November Crop Report	1129
October Report of the British Board of Agriculture	1129
Broomhall's Foreign Crop Cable November 20th, 1917	1130
Exports from the Union of South Africa	1130
Live Stock Statistics	1130

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OF CANADA

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The AGRICULTURAL GAZETTE of Canada is published monthly, in English and in French, by the Dominion Department of Agriculture. It is not intended for general circulation. A limited number of copies, however, are available to subscribers at \$1.00 per annum, or 10 cents per copy.

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SERVICE WITHOUT SACRIFICE

MANY agencies are at work to increase the production of food, a service which it has often been declared will win the war. Of these perhaps none have been farther reaching than the vacant-lot gardening movement. All the warring countries have exercised strong effort to make full use of Mother Earth in securing nourishment for man. In England the allotment system under the Act of 1887 has attained extensive proportions. On this continent no controlling legislation has been enacted, but practically every urban centre has done more gardening than ever before and most cities have systematically recalled to cultivation much of the fertile lands that were lying idle as a result of speculation.

Vacant-lot gardening has received impetus from two motives. Patriotism and relief from the burden of obtaining the necessities of life, have, in many places, made the efforts of organizations and individuals to get the work under way comparatively easy. Great credit, however, must be ascribed to earnest men and women who have by perseverance aroused indifferent municipal bodies to see the need and to take action.

Western cities were among the first to introduce into Canada the vacant-lot gardening movement. As readers of THE AGRICULTURAL GAZETTE know an organization in Ottawa took the work up three years ago. It was not until the winter of 1917, however, that the movement became general over Canada. Through the agencies of federal, provincial, municipal and other bodies, particularly horticultural societies, a strong campaign was carried on with a result the magnitude of which would be difficult to estimate. To give some idea of this, and to afford the fullest information on methods of organization and operation, there is published in Part IV of this number of THE GAZETTE summarized reports of the Vacant Lot Gardening work in 1917 in the cities of upwards of ten thousand population. It has been a worthy work that has enabled many thousands of men and women to secure relief, to enter into partnership with Nature and to render continuous service without sacrifice.

PART I

Dominion Department of Agriculture

INFORMATION SUPPLIED BY OFFICIALS OF THE VARIOUS
BRANCHES REPRESENTED

GOVERNMENT EXHIBITION WORK

THE WOOL EXHIBIT OF THE LIVE STOCK BRANCH

BY T. REG. ARKELL, B.S.A., B.Sc., CHIEF, SHEEP AND GOAT DIVISION

WOOL in the fleece competitions which were inaugurated last year by the Minister of Agriculture through the medium of the Live Stock Branch have been more successful this year.

Entries have increased and at some fairs the secretaries were so convinced of the necessity of these exhibits that on the day of judging they increased the number of prizes; in one instance additional distinctions were arranged.



DOMINION LIVE STOCK BRANCH—SECTION OF WOOL EXHIBIT

Fleeces have been exhibited in better condition and greater numbers. There has been great improvement in the handling of exhibited fleeces and this also reflects itself on the entire output of the exhibitors.

More attention is now being paid to this matter by the fair secretaries who have experience along this line.

Most of the eastern exhibitions gave prizes in three classes, namely, Fine Medium, Medium and Coarse,

but Toronto, Ottawa and Three Rivers made their lists more complete by adding a fourth class, Lustre. Competition was keen and much good wool was exhibited by wool growers. Western fairs confined themselves to three wide classes, Fine, Medium and Coarse. However, Brandon exhibition made a more complete classification by making a difference between range and domestic wools.

A full and detailed score card is used in judging these fleeces and it has proved very satisfactory. Three defects which caused disqualification are the presence of sisal fibre or binder twine, dung locks and paint.

THE ENTRIES BY CLASSES

A table of the number of entries in the different classes at the principal exhibitions is herewith given:—



DOMINION LIVE STOCK BRANCH—SECTION OF WOOL EXHIBIT

	Fine	Medium	Coarse	Totals
Provincial Exhibition of Manitoba, Brandon	4	15	8	27
Calgary Industrial Exhibition	10	13	5	28
Edmonton	12	20	6	38
Provincial Exhibition, Regina		4		4
Saskatoon Industrial Exhibition		3		3
Vermilion Exhibition	3	3		6
Vancouver..	4	5	4	13
	Fine Medium	Medium	Coarse	Totals
Canadian National, Toronto	41	16	14	71
Central Canada, Ottawa..	18	16	6	40
Western Fair, London	16	26	18	60
Orms town	2	8	18	28
Quebec Provincial Fair, Quebec	4	9	9	22
Great Eastern Exhibition, Sherbrooke	4	7	8	19
Three Rivers.....	3	7	5	15
Valleyfield.	1	6	5	12
Nova Scotia Provincial, Halifax	3	3	2	8
P.E.I. Agricultural and Industrial, Charlottetown.	4	21	13	38

At Toronto, Ottawa, Brandon and Three Rivers there were four classes.

THE EXHIBIT

Exhibitions extending from coast to coast included the wool exhibit in instructional features and more interest was taken in it than on previous occasions. The aim of the exhibit was to show wool in all its natural phases and all stages of manufacture together with the defects at present sometimes found in the marketing of wool and their remedies.

Among the larger exhibitions visited might be mentioned:—

Ottawa Winter Fair, Ormstown,

In order to command the highest market prices wool should be presented in a carefully folded and packed condition and should contain as little foreign matter as possible. The graded product is also more acceptable to the trade than where all qualities are mixed.

Actual demonstrations in grading wool were given at the exhibitions by the wool experts in attendance and over 750,000 copies of pamphlets were distributed to those interested in sheep husbandry topics, which



DOMINION LIVE STOCK BRANCH—SECTION OF WOOL EXHIBIT

Calgary, Edmonton, Brandon, Regina, Saskatoon, Prince Albert, Vancouver, Duncans, B.C., Kamloops, B.C., Quebec, Valleyfield, Three Rivers, Sherbrooke, Halifax, Charlottetown, Summerside, P.E.I., Ottawa, Toronto, London, Windsor, Renfrew, Almonte, Ont.

The object of the exhibit is to explain fully the various classifications and grades, and to show how wool may be handled in such a way as to secure the best advantages to both the producer and the buyer.

acts as a measure to some degree to show the enthusiasm which now exists on the part of the farmers towards the sheep industry.

INCREASE IN SALES

The exhibit has proven most helpful in arousing interest in co-operative wool sales, which this year have shown a marked advancement. Three years ago about 200,000 pounds of wool were offered for co-operative sale; this year over two and one-half million pounds have been disposed of in this fashion.

SPECIAL FEATURES

New features illustrated this year were Canadian manufactured products of domestic wools. This included homespun rugs, mats, suitings, blankets, bed covers and stockings. Modern machinery was contrasted with the means of manufacture one hundred years ago. Various finished products made from mohair were shown, including plushes and theatrical wigs. Greater space than last year was utilized at the Canadian

National Exhibition, Toronto, where a very complete exhibit was erected. A special display was prepared showing the different classes of woollen machines in actual operation, in order that the public may understand the character of wool entering into different fabrics and the manner in which it is made. There were also exhibited all of the grades of wool produced in Canada and these compared with the qualities in other countries and foreign wool imported here.

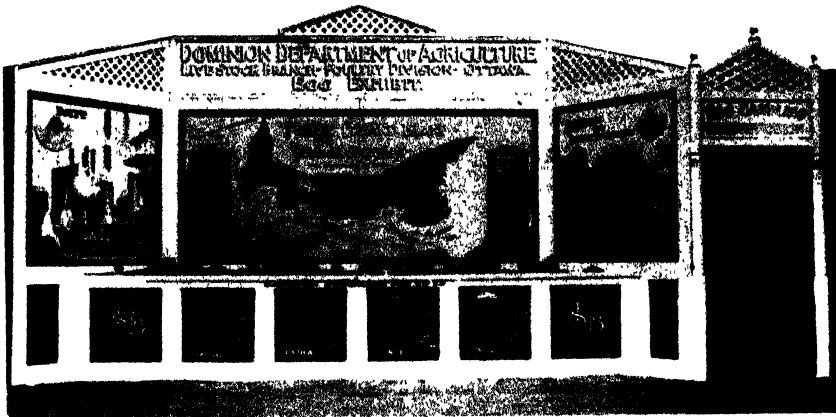
THE EGG EXHIBIT OF THE LIVE STOCK BRANCH

BY ERNEST RHOADES, B.S.A

THE Poultry Division of the Live Stock Branch exhibited two classes of educational displays at the fairs and exhibitions in Canada in 1917. The accompanying illustration represents the exhibit made at the larger fairs such as the provincial exhibitions. The smaller exhibit featured especially the stand-

circumstances. Ease in handling has of necessity to be kept in mind when planning such exhibits and an endeavour has been made to erect exhibits bearing a maximum of information in a minimum of space.

The activities conducted by this Branch in connection with poultry have in the past been almost entirely



LIVE STOCK BRANCH—EGG EXHIBIT AT LARGER FAIRS.

ardization of eggs and poultry. In addition to these three older exhibits have been used at different times on account of the overlapping of exhibition dates. These exhibitions were all of a portable nature and made as attractive as possible under the

upon market improvement lines, and this work has been especially featured in the exhibits sent out. The course of the egg has been followed from the poultry flock to the consumer's table, and methods of handling at the farm and in the different

stages between the farm and the consumer have been shown as they exist and as they should be carried out in order to save the tremendous loss which has resulted in the past from poor methods of handling and marketing.

The larger exhibit (illustrated on this page) was designed to illustrate how Prince Edward Island has been organized to market her eggs and poultry co-operatively, Denmark being featured as an outstanding example of success achieved through co-operation, and Egypt as an early example of the "open market," the ideal system of marketing. An instructive feature was the electrically lighted models designed to

illustrate the system followed in gathering eggs in the country districts, delivering them to the central station, shipping to the central candling station and from there to the dock for transportation. The standards for Canadian eggs "Specials," "Extras," "No. 1's and No. 2's," were illustrated in natural colour by electrical illuminations in front of the exhibit, the eggs appearing as they do in the actual candling operation. In 1917 forty-two fairs and exhibitions were reached. At these exhibitions upwards of 220,000 people viewed the exhibit and 15,000 attended candling demonstrations most of whom applied for candling appliances and literature.

THE EXPERIMENTAL FARMS EXHIBIT

BY W. A. LANG, ACTING CHIEF, DIVISION OF EXTENSION AND PUBLICITY

IN 1914 the Division of Extension and Publicity was organized with the late Mr. J. F. Watson as Chief Officer. The object of the Division, as its name would imply, is the extension of agricultural knowledge and the general publicity of Experimental Farm activities. The first steps in this direction were:-

1st. The issuing of a publication of the Experimental Farms- "Seasonable Hints."

2nd. An energetic campaign to enlarge the free mailing list.

3rd. Preparing exhibition circulars.

4th. Inaugurating a system of Experimental Farm exhibits throughout the Dominion.

"Seasonable Hints," issued three times a year, dealing briefly and practically with seasonable features of farm work, is distributed from the Publications Branch. It is prepared by the Director and chief officers of the Division and its aim is to give advice at the right time.

EXTENT AND METHOD OF CIRCULATION

The campaign to enlarge the free

mailing list has succeeded in reaching a very large number of farmers with the lessons secured by the work of the Experimental Farms. On the requests of farmers reached, about 40,000 names are being added annually. The combined lists on all subjects now include about 275,000 names of persons to whom are sent not only "Seasonable Hints" and other general publications of the Experimental Farms, but corresponding reports, bulletins and pamphlets issued by the other branches of the Department. To the respective subject subdivisions of the list are sent the bulletins issued by the Department on the corresponding subject.

Some one hundred exhibition circulars have been carefully prepared for distribution at agricultural fairs and exhibitions. They are really much condensed and boiled down bulletins, and deal very concisely with the main features of agriculture.

THE EXHIBITION WORK

Probably the most important work of the Division may be said to be the

exhibition work undertaken. It was decided that in order to cover as much ground as possible an exhibit should operate from each experimental farm and station, and the main features of each of these exhibits was prepared at the Central Farm. There are seventeen of these farms' exhibits and three exhibits are sent out from the Central Farm, making in all twenty travelling exhibits.

One hundred and sixty-two exhibitions were attended last year, but there are some six hundred agricultural fairs held annually, many of

and cheese making, samples of dairy products, etc.

Field Husbandry shows the advantage of crop rotations, etc.

The Division of Forage Crops emphasizes the necessity and wisdom of producing home-grown seed and features recommended, varieties of roots, ensilage corn, clover, alfalfa, grasses.

The Cereal exhibit consists of both grain in the straw and threshed grain of the different varieties recommended by the Dominion Cerealists.

Each exhibit has its horticultural



CEREAL EXHIBIT, DOMINION EXPERIMENTAL FARMS AT CENTRAL CANADA EXHIBITION

them on the same day. The exhibition season being short, it would appear, therefore, that the Division can only hope to cover all the ground in, say, three years.

NATURE OF THE EXHIBITS

Each exhibit is prepared with the idea of featuring some work of each Division. In Animal Husbandry are shown models of horse, cattle, sheep and hay barns, hog cabins, sheep-dipping outfits, self-feeders for hogs, the different appliances for butter

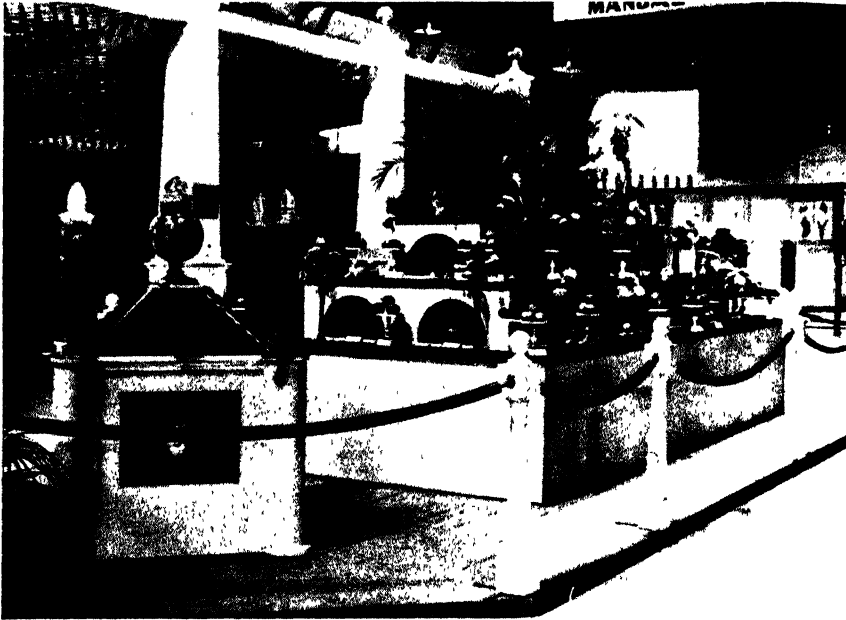
display consisting of fruit, flowers and plants, etc., selected from material grown on the local farm.

Some valuable information for stock men is furnished by the Chemical Division, illustrating the relative quantities of the various elements which enter into the composition of the different kinds of feeds, interesting information on the value of fertilizers, soil analysis, etc.

In the Botanical Division are shown various plant diseases, mounts of the different weeds, medicinal plants, etc.

The Division of Apiculture shows exhibits of honey, extracted and in the comb, and all the various bee-keepers' appliances.

The Fibre Division, which is carrying on a very important and opportune work, shows what can be and ought to be accomplished in the



HORTICULTURAL SECTION, EXPERIMENTAL FARMS EXHIBIT, CENTRAL CANADA EXHIBITION

The Poultry Division features the different models of recommended colony and farmers' poultry houses, feeding appliances, recommended feeds, etc.

development of flax and its products.

The Tobacco Division shows what can be done in Canada in the cultivation of tobacco.



THE FLAX EXHIBIT, EXPERIMENTAL FARMS, CENTRAL CANADA EXHIBITION

THE METHOD FOLLOWED

Each Experimental Farm exhibit operating from its own centre naturally features, as well, exhibits of a somewhat local character. The grain, grasses, fruit etc., shown are those suitable and successful in that particular district and the models of buildings, etc., suitable for climatic conditions.

The aim of the Division of Extension and Publicity is to have capable trained men in charge of the exhibits in order that inquirers may be met

with definite information and advice so that the suggestion "Bring your problems to the Experimental Farm officials" may bear fruit.

The great value of agricultural fairs is freely admitted. No greater stimulus to better seed selection, better cultural methods, better stock and generally better farming can be found than is prompted by the keen competition in the various classes of the average agricultural fair, and having this in mind the Experimental Farms exhibit becomes a very important adjunct to these fairs.

THE DOMINION EXPERIMENTAL FARMS

THE DIVISION OF HORTICULTURE

EXPERIMENTS WITH POTATO SEED

BY W. T. MACOUN, DOMINION HORTICULTURIST

THE yields from potatoes grown at the Central Experimental Farm, Ottawa, having declined very much during the years 1906 and 1907, owing, it was thought, to two seasons of great drought, very unfavourable to the potato crop, a change of seed of six varieties was tried in 1907, the tubers being obtained from the Experimental Farm, Nappan, N.S. These potatoes yielded almost twice as much as the home grown seed and when this stock was planted again in 1908, the yield was again almost double that from the stock which had been grown for a number of years at Ottawa and which had gone through another unfavourable season in 1908. The results of the test in 1908 were published in the Annual Report of the Experimental Farms for 1909.

In 1910 seed potatoes of eleven

varieties were obtained from the Experimental Farm, Indian Head, Sask., and compared with seed of the same varieties which had been grown at Ottawa for a number of years. The average yield per acre from the eleven varieties from Indian Head was 368 bushels 30 lb. per acre and from Ottawa seed 96 bushels 42 lb. per acre, an average difference for the eleven varieties of 271 bushels 48 lb. per acre. In the cases of five varieties the yield from the Indian Head seed was over four times that from the Ottawa seed. Since that time other comparisons have been made between Ottawa grown seed and that from other sources.

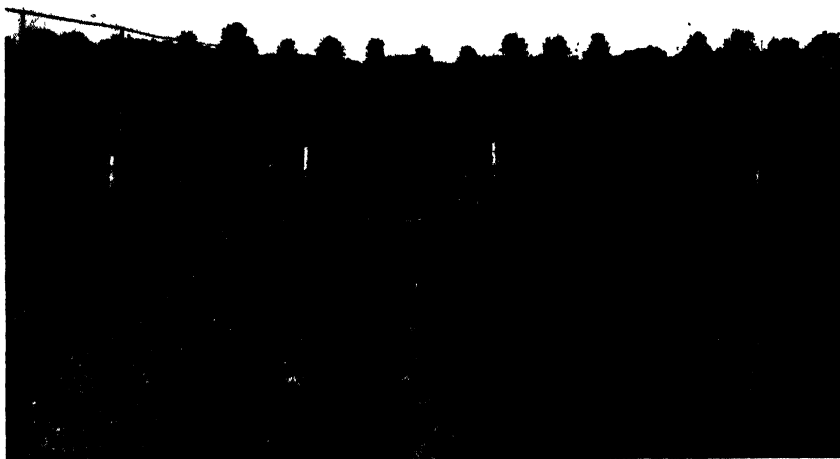
Following are some of the results obtained in 1917 at Ottawa, when a comparison was made between seed from the Experimental Station, Fredericton, N.B., and Ottawa seed:

	FREDERICTON SEED		OTTAWA SEED	
	Yield per acre in 1917		Yield per Acre in 1917	
	Bush.	Lb.	Bush.	Lb.
Irish Cobbler	360	48	68	12
Green Mountain	345	24	99	00
Gold Coin . .	356	24	22	00
Carman No. 1.	244	12	114	24
Table Talk . .	258	48	224	24

The Ottawa seed stock came from Fredericton in 1915 and had been grown only one year in Ottawa, showing rapid deterioration.

Following is a comparison of yields from seed from Fredericton, N.B., Port Arthur, Ont., and Ottawa in 1917:—

	GREEN MOUNTAIN					
	Total Yield		Yield per Acre		Yield per Acre	
	per Acre, 1917		Marketable, 1917		Unmarketable, 1917	
	Bush.	Lb.	Bush.	Lb.	Bush.	Lb.
Fredericton seed.	341	00	257	24	83	36
Port Arthur seed	400	24	360	48	39	36
Ottawa seed . .	85	48	68	12	17	36



HORTICULTURAL TRIAL PLOTS—CENTRAL EXPERIMENTAL FARM

Potatoes in the foreground yielded in 1917 at Ottawa less than one hundred bushels per acre. Potatoes in the back ground, behind line of stakes, grown from immature seed (from plots away from other potatoes in 1916) yielded at the rate of over 300 bushels per acre in 1917

These experiments show that there was a marked advantage in obtaining seed from any one of a number of sources.

In order to find whether a difference in soil would make any difference in the results, seed of Irish Cobbler, Green Mountain and Table Tal was obtained from the Fredericton Station in 1916 and planted at Ottawa in sandy soil, black muck, and a rather

heavy sandy loam. As the potatoes were beginning to be stolen these were all dug while the tops were still green and in the spring of 1917 were planted in rows side by side with the results in the following table. There are also given in the table the yields from the same varieties from Ottawa seed grown among the other varieties and dug with the main crop.

YIELDS IN 1917 FROM POTATOES DUG WHEN IMMATURE, 1916, AS COMPARED WITH THOSE GROWN AND DUG WITH OTHER VARIETIES, 1916

	Sandy Soil, 1916		Black Muck, 1916		Heavy Sandy Loam, 1916		Grown and Dug with Other Varieties, 1916	
	Yield per Acre, 1917		Yield per Acre, 1917		Yield per Acre, 1917		Yield per Acre, 1917	
	Bush.	Lb.	Bush.	Lb.	Bush.	Lb.	Bush.	Lb.
Irish Cobbler	321	12	380	36	398	12	68	12
Green Mountain	330	00	325	36	378	24	85	48
Table Talk	365	12	276	6	319	00	224	24

It will be noted that the results in 1916, as compared with those grown are very much in favour of the among the poor Ottawa stock and potatoes grown from those dug when left until normal digging time. immature and grown by themselves

YIELD OF POTATOES, 1917, FROM STOCK OBTAINED FROM FREDERICTON IN 1916, AND PLANTED AT DIFFERENT DATES AT OTTAWA IN 1916, AND THE CROP FROM EACH PLANTING KEPT SEPARATE AND THE SEED PLANTED IN 1917

	1916, Date Planted	Yield per Acre, 1917					
		Total		Marketable		Unmarketable	
		Bush.	Lb.	Bush.	Lb.	Bush.	Lb.
Green Mountain.	May 22	6	36	00	00	6	36
"	June 5	33	00	22	00	11	00
"	June 19	35	12	19	48	15	24
"	July 3	22	00	8	48	13	12
Table Talk	May 22	81	24	55	00	26	24
"	June 5	114	24	88	00	26	24
"	June 19	187	00	160	36	26	24
"	July 3	224	24	180	24	44	00
Irish Cobbler	May 22	37	24	17	36	19	48
"	June 5	35	12	17	36	17	36
"	June 19	96	48	70	24	26	24
"	July 3	118	48	74	48	44	00

The yields from the above tests were small and show remarkably low yields obtained from Ottawa seed, but it is interesting to note that, with the exception of the last planting of Green Mountain and the second planting of Irish Cobbler, there is a regular increase in yield from the earliest to the latest plantings, which would seem to be evidence that the potatoes which were the most immature gave the best yields. This is in accordance with experience of growers elsewhere and corroborates experience of previous years at Ottawa.

CONCLUSIONS IN REGARD TO SOURCE OF SEED AND IMMATURITY OF SEED

The cause or causes of the very low yields at the Experimental

Farm, Ottawa, during recent years from seed grown at Ottawa the previous year, are not yet clearly understood. The low yields began in the dry seasons of 1906, 1907, and 1908, and there have been few good years for potatoes since, and while, since that time, the diseases such as Leaf Roll, Mosaic and Rhizoctonia all have been found affecting the potato plants at Ottawa. By getting new seed every year from certain places, good yields can be obtained. While such marked results might not be obtained elsewhere as at Ottawa, a change of seed is recommended where satisfactory yields are not being obtained. It has been the writer's observation that wherever potatoes grow vigorously, as a rule, until the tops are

cut down by frost in the autumn, there will good seed potatoes be obtained, provided they are free from disease. Such sources of seed potatoes can be found in all the provinces of Canada and particularly in those parts of the provinces where the days and nights during the growing season are relatively cool and where there is usually a good supply of moisture in the soil.

Immature potatoes have been recommended for seed in England for at least one hundred years. It has been shown by the experiments at Ottawa

that the best results were obtained from the most immature seed, and while, doubtless, there is some other factor or factors than immaturity which ensure such good results from seed from the cooler parts of Canada, and which for the present may be called "vitality," it would seem, with our present knowledge that the best seed will come from those parts of Canada where, as a rule, the main part of the crop is most immature, though of good marketable size, when the tops are cut down by autumn frosts, and where there is little or no disease in the crop.

DOMINION HORTICULTURIST ELECTED TO IMPORTANT OFFICES

W. T. MACOUN, Dominion Horticulturist, early in November attended the annual meetings of the American Pomological Society at Boston, and the Potato Society of America at Washington. At each of these con-

ventions Mr. Macoun was elected first vice-president. He also attended a special meeting of the Society for Horticultural Science held in conjunction with the American Pomological Society. Of this association Mr. Macoun is also first vice-president.

CANADIAN MAPLES FOR OUR SOLDIERS' GRAVES IN FRANCE

THE Royal Botanic Gardens, Kew, England, in co-operation with the Horticultural Division of the Experimental Farm, Ottawa, has been growing maple trees from seed gathered for the purpose of transplanting the trees to the places where Canadian soldiers lie buried in France. The seed was gathered at Ottawa in 1916 of the red and silver maples, and seed of the large-leaved maple was gathered the same year at the Experimental

Station at Sidney, Vancouver Island, and sent to the Royal Botanic Gardens, Kew. The seed germinated well, and in a letter received recently by Mr. W. T. Macoun, Dominion Horticulturist, from Dr. Arthur W. Hill, Assistant Director of the Royal Botanic Gardens, Kew, it is stated that some of the young trees are already in France and growing well, and it is hoped to send a further batch of plants over before the winter.

THE HEALTH OF ANIMALS BRANCH

THE CHIEF PATHOLOGIST RESIGNS

Charles H. Higgins, D.V.S., B.Sc., Chief Pathologist of the Health of Animals Branch has resigned to accept the position of agent in Canada of an antitoxin manufacturing firm in New York city.

Dr. Higgins joined the Health of Animals Branch in 1899 and has,

since 1902, been at the head of the Biological laboratory established that year.

Dr. S. Hadwen, formerly in charge of the Veterinary Research Laboratory in Agassiz, B.C., has succeeded Dr. Higgins as acting Chief Pathologist.

THE ENTOMOLOGICAL BRANCH

THE FALSE TUSSOCK CATERPILLARS ON SHADE TREES

BY J. M. SWAINE, IN CHARGE OF FOREST INSECT INVESTIGATIONS

DURING the past summer the shade trees of Eastern Canada have suffered from a rather severe outbreak of defoliating caterpillars. Among the most abundant and widely distributed of these were certain densely hairy species commonly known as the *Halsidota* Tussock or False Tussock Caterpillars. They were the subject of a large number of inquiries this season from many parts of the Eastern Provinces, and, while they are not included among our most destructive shade-tree pests, they were sufficiently abundant in many places to inflict noticeable injury and to cause considerable alarm. Fortunately, they are usually controlled by their parasites before the outbreak attains very serious proportions. They are more abundant this summer, perhaps, than in any season since that of 1911, but their cocoons will probably be heavily parasitized as usual.

GENERAL HABITS

The moths of these species appear from the cocoons in early summer and deposit their eggs upon the foliage. The caterpillars are found feeding upon the leaves during the latter half of July, August and the first part of September. By the end of September nearly all have spun their oval, hairy cocoons, usually beneath loose objects upon the ground. During October they change to the pupal stage within the cocoon and remain quiescent until the following June, when the adult moths emerge from the cocoons and appear on the wing.

The caterpillars are general feeders and are found upon many different

kinds of deciduous shade and forest trees. The Hickory Tussock and the Spotted Tussock are usually the more abundant and are responsible for considerable defoliation. The caterpillars are familiar to nearly everyone and should be recognized from the figures; the adults are modest, yellow and brown, night flying moths and are less frequently seen.

THE HICKORY TUSSOCK MOTH

Halsidota caryae Harris

The conspicuous black and white caterpillars of this species are the most injurious of the false tussocks, probably owing largely to their gregarious habits while young.

THE MOTH

The *adult* is a yellow and brown moth with a wing expanse of nearly two inches. The fore wings are ochre-yellow, heavily dusted with brown scales, with five, irregular, subtransverse, incomplete rows of spots, of which those along the costal border and towards the base are yellow, and the others transparent; the outer or distal row is submarginal. The hind wings are pale yellow, subtransparent and immaculate. The body is thickly clothed with yellowish brown hairs, with a diagonal brown line on each side of the thorax. The male moth is smaller than the female and the antennae are more featherlike.

THE CATERPILLAR

The Hickory Tussock caterpillar is black and white, with a black head

and is about an inch and a half in length when full grown. It is clothed with dense spreading tufts of white hairs with pencils of longer white hairs in front and behind, a pair of long, black pencils of hairs on the first and seventh abdominal segments, and a row of conspicuous black spots along the middle of the back on the abdomen; one spot appears on each

THE PUPA

When full grown each caterpillar constructs a hairy cocoon about itself, composed chiefly of hairs taken from its own body, and the cocoons are consequently *greyish* in colour. They are stout oval in shape and about three-fourths of an inch in length, commonly found beneath



THE HICKORY TUSOCK, A CATERPILLAR AND COCOONS IN DIFFERENT STAGES OF CONSTRUCTION, THE TWO IN THE UPPER LEFT HAND CORNER COMPLETED; ABOUT NATURAL SIZE. (Original)

segment and all are joined together by a narrow, median, black line.

THE EGGS

The eggs are white and are laid to the number of a hundred or so in a patch on the under side of a leaf during early summer.

boards and loose objects on the ground in places where the caterpillars have been abundant. Shortly after the cocoon is completed the caterpillar changes to the pupa and remains quiescent within its covering until the following June, when the moth emerges.

HABITS

The conspicuous black and white caterpillars are found upon the foliage during the later half of July, August and early September. They are gregarious at first, the caterpillars

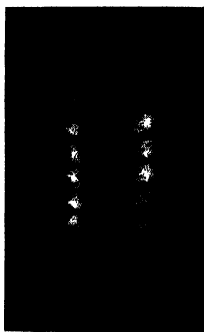


THE HICKORY TUSSOCK CATERPILLAR, ABOUT NATURAL SIZE. (Original)

from one egg-mass feeding together for a considerable time, and they are on this account able to defoliate entire branches. As they approach maturity the groups of caterpillars break up; the individuals wander about over the foliage, and finally seek a crevice beneath some object on or near the ground within which the hibernating cocoon is spun. Small larvae may be found by the middle of July; by the end of August many caterpillars are nearly ready for pupation; and practically all will have spun their cocoons before the end of September.

HOST TREES

The list of food plants includes a very large number of deciduous shade trees and forest trees. Among these are: hickory, walnut, elm, butternut, hawthorn, rose, apple, ash, linden, oak and locust.



THE SPOTTED TUSSOCK CATERPILLAR; ABOUT NATURAL SIZE. (Original)

THE SPOTTED TUSSOCK
Halisidota maculata Harris
THE ADULT

The adult moth is very similar to the Hickory Tussock moth, about the same size, but with a ground colour of darker brown, with the rows of spots forming more delicate bands, and with the outer or distal row usually much larger than the others and reaching the outer margin. The hind wings are yellowish, subtransparent, and immaculate. The body is densely clothed with yellowish or brownish hairs, with a lateral brown line on each side of the thorax.



THE HICKORY TUSSOCK MOTH; NATURAL SIZE. (Original)

THE CATERPILLAR

The caterpillar is usually somewhat less than an inch and a half in length when full grown, with a black head; clothed with dense tufts of yellowish hairs on the median segments of the body, varied by a row of disconnected black spots along the middle of the back, and with black hairs on the first four and the last three segments, interspersed with a few, conspicuous, long, yellowish white pencils.

THE PUPA

When full grown the caterpillar wanders about seeking a suitable hiding place beneath a board or loose stone. Here it constructs a stout, oval, *yellowish*, hairy cocoon about three-fourths of an inch long, composed of silk interwoven with hairs removed from its own body. Within

the cocoon it changes shortly to the pupa, from which the moth emerges the following June.

HABITS

The caterpillars of this species feed upon the foliage of a large number of deciduous trees; in this country it seems to prefer alder, apple, willow



THE SPOTTED TUSSOCK MOTH; NATURAL SIZE. (Original)

and Manitoba maple, although it is usually recorded from the Eastern States as an oak-feeding species, and has been called on that account the Oak Tussock Caterpillar. It rarely occurs in sufficient numbers to cause serious injury, but in conjunction with other species of caterpillars, it sometimes disfigures shade trees or injures fruit trees sufficiently to require control.

THE PALE TUSSOCK, OR CHECKERED TUSSOCK

Halisidota tessellaris Smith and Abbot

The adult moth is of the size and shape of *caryae* and *maculata* and has markings of a similar type, but it is very much paler, with a beautiful greenish tinge which fades after death. The fore wings are very pale, marked alternately with very pale brownish and nearly transparent, transverse bands, with the yellowish scales more noticeable about the margins and at the base. The hind wings are yellowish, subtransparent and immaculate. The body is densely clothed with orange-yellow hairs, marked on each side of the

thorax with a diagonal line of blue diverging behind; the under surface of the body is very pale yellow.

The caterpillar is about one and a quarter inches long, inconspicuously coloured with yellowish-buff hairs, and with the head brownish-black; the body is densely clothed with tufts of yellowish-grey hairs, varied by a narrow, blackish line along the middle of the back, and with a pair of long, black, dorsal pencils of hairs on each of the second and third thoracic segments, and a similar pair more laterally placed on the eighth segment of the abdomen; long tufts of pale hairs are more or less distinct, particularly on the third thoracic segment.

The caterpillars feed upon a very large number of our native trees and shrubs, but they are seldom numerous enough to require special control measures.



THE PALE TUSSOCK MOTH, NATURAL SIZE (Original)

CONTROL MEASURES

When the young caterpillars are numerous and the injury will apparently be sufficient to warrant the expense, the *Halisidota* caterpillars may be easily controlled by spraying the infested foliage with lead arsenate or Paris green. Lead arsenate paste* should be used at the rate of 2½ pounds in 40 gallons of water, or Paris green at the rate of 5 ounces, mixed with 1 pound of freshly slaked lime, in 40 gallons of water. Orchard trees which receive the regular poisoned sprays are usually well protected.

NATURAL CONTROL

The caterpillars are found in large numbers only after intervals of several years, and the outbreak seldom lasts longer than one season. Usually, at the end of the first season in which the caterpillars are notably conspicuous, the great majority of the cocoons will be found to be parasitized, and for several years following the caterpillars will be present in that locality in only moderate numbers. If it were not for this effective parasitic

control we should undoubtedly find the *Halisidota* Tussock caterpillars among our most important shade tree pests. Of the parasites which we have bred from the *Halisidota* cocoons the common ichneumon, *Scambus pedalis* Cresson, is the most abundant. *Theronia melanocephala* Brullé and *Amblyteles malacus* Say have been bred from *Halisidota* caterpillars by Mr. W. H. Harrington.

*The powdered lead arsenate should be used at one-half the strength given above.

THE LIVE STOCK BRANCH

THE LIVE STOCK COMMISSIONER

MR. H. S. Arkell, M.A., B.S.A., has been appointed Live Stock Commissioner succeeding Mr. John Bright, deceased. Mr. Arkell, who is a son of the late Henry Arkell, a well-known stock raiser at Teeswater, Ontario, was born in 1880. He received his advanced education at the Woodstock, Ontario, College, McMaster University and the Ontario Agricultural College. His public service began with the position of lecturer in animal husbandry at the Ohio State University in 1904-05. During the next two years he lectured in animal husbandry at the Ontario Agricultural College and from 1907 to 1910 was Professor of Animal Husbandry at Macdonald College. In 1910 Mr. Arkell was appointed Assistant Live Stock Commissioner, which position he held until his present advancement to the office of Live Stock Commissioner for Canada.



H. S. ARKELL, M.A., B.S.A.
Live Stock Commissioner for Canada

THE PORK PRODUCTION CAMPAIGN

MEETING OF WESTERN PROVINCE REPRESENTATIVES

FOLLOWING up the meeting of Deputy Ministers of Agriculture and representative swine breeders from the Eastern Provinces recorded in the November number of THE AGRICULTURAL GAZETTE, page 955, a meeting was called, under instructions of the Federal Minister of Agriculture, of Deputy Ministers and representative agricultural officials and breeders from the Western Provinces and held in Ottawa, according to announcement in the GAZETTE, on November 7th. The conference, with its auxiliary gatherings, covered three days, not closing until the evening of the 9th. The Live Stock Commissioner, Mr. H. S. Arkell, presided, and the Food Controller, Hon. W. J. Hanna, attended on the first day, which was exclusively devoted to discussion of ways and means for increasing the production of hogs.

As at the first gathering, that from the Eastern Provinces, Mr. Hanna pointed out the seriousness of the situation consequent upon the shortage in both the warring and neutral countries, accelerated by the difficulties of navigation due to the submarine menace and deficiency of tonnage. A free and full discussion followed taking up the whole day, during which a resolution was arrived at to call the movement The Pork Production Campaign instead of The Bacon Production Campaign, and resulting in three committees being appointed to consider the problems that had been raised, namely, one on marketing, another on labour and

the third on feeds. In the evening the Honourable the Federal Minister of Agriculture entertained the delegates to the convention at an informal dinner, at which the Minister, the Food Controller and other speakers affirmed and enlarged upon what had been said in the morning on the gravity of the situation, not only as regards hogs but as regards all classes of live stock.

The two succeeding days were taken up by the committees in consideration of the questions involved and a series of resolutions were agreed to in accordance with the views expressed.

The resolutions adopted by the Marketing Committee pledged the hearty co-operation of the swine growers of the four Western Provinces in efforts to secure an increase in the world's meat supply, urged closer control of packers' transactions, asked that Great Britain be appealed to to buy direct from Canada and not through Chicago, requested an extension of the cold storage facilities, advocated the conscription of unused lards as a war measure for productive purposes and asked the Food Controller for certain information.

The Labour Committee favoured the exemption of *bona fide* farm labour and the Committee on Feeds urged the Government to take over the entire output of screenings and endorsed the report of the committee on feeds appointed by the Eastern Live Stock representatives.

THE DEPARTMENT HONOUR ROLL

FURTHER LIST OF THE EMPLOYEES OF THE DEPARTMENT OF AGRICULTURE WHO HAVE ENLISTED FOR OVERSEAS SERVICE

H. B. Laing, Patent Branch.

S. A. Bjarnason, Experimental Station, Morden, Man.

CASUALTIES

F. M. McKenzie, Entomological Branch, Outside Service, (killed in action).

PART II

Provincial Departments of Agriculture

PROVINCIAL EXHIBITION WORK

NOVA SCOTIA

BY M. CUMMING, SECRETARY FOR AGRICULTURE

AT the Provincial Exhibition held in Nova Scotia this year our Department had three special lines of exhibits.

(1) Live Stock exhibit, consisting in the main of cows from the College farm that had given large productions of milk. In each case the records of the cows were prominently posted in the stalls where each one was kept, and the whole exhibit was put on as a means of inspiring those who studied it to keep a better class of live stock. In connection with this exhibit a convenient booth was prepared containing chairs where farmers could drop in and talk matters over with our men. From this booth various publications were distributed and photographs and striking posters were placed all

round the walls.

(2) Our Domestic Science Department, under Miss Jennie A. Fraser, carried on during the fair a canning demonstration in connection with which was shown a splendid display of all kinds of garden produce. A practical gardener from our institution was in charge of this exhibit. He gave practical instruction to all who requested it.

(3) A soils exhibit was fitted up under the direction of our Professor L. C. Harlow, Professor of Chemistry at the Agricultural College.

All these exhibits attracted an unusual amount of attention and if one could judge from the questions asked the work would seem to have proven well worth while.

CHEMISTRY EXHIBIT OF THE AGRICULTURAL COLLEGE

BY L. C. HARLOW, B.SC., B.S.A., CHEMIST

THE Department of Chemistry realizes that while the great majority of a crowd of 75,000 people at an exhibition are out for pleasure and excitement, yet there are many who are ready and anxious to learn something about so uninteresting a thing as the *soil*, the source of all wealth.

While an exhibition is primarily a place for displaying in competitions, the results of skill in the arts of

farming, mining, etc., there should be side shows of a purely educational nature. The booth of this Department was arranged with a view of not only giving information to those who are ready to study for a few minutes, but also for drawing attention to the various ways in which the Department is ready to serve the farmer.

Some were attracted by our sign:—

"INQUIRE HERE ABOUT THE
FREE ANALYSES OF
SOILS.
FERTILIZERS.
LIMESTONE.
FEEDING STUFFS.
WATER."

The soil survey work gave us a chance to display for comparison twenty representative soils from various parts of the province. Cards were attached stating the total amounts of phosphoric acid, potash, nitrogen, organic matter and lime found in each of these soils.

By samples and charts, emphasis was put upon the importance of maintaining fertility by the careful use of *home* material, such as farm manure, green manure, fish scrap and sea-weed.

Samples of limestone and marls from the numerous deposits of Nova Scotia, with pots of clover grown on lime and limed soil, pots of turnip grown on club root infested soil, treated and untreated with burnt lime and lime stone, drew attention to the much discussed question of the use of agricultural lime.

The method of testing the acidity of the soil was demonstrated. Illustrations were given of the effect of plaster and lime on the physical condition of the soil, of the variations in the power of soils to hold water and of the losses of fertilizers by bleaching.

Circulars on the chemistry of soils and limestone were distributed. About 600 interested parties discussed the problems suggested by this exhibit.

THE FARM DEPARTMENT

BY JOHN M. TRUEMAN, B.S.A., PROFESSOR OF AGRICULTURE AND FARM SUPERINTENDENT

THE Farm Department of the Nova Scotia Agricultural College exhibited a number of cattle at the Provincial Exhibition in Halifax. Sixteen head were exhibited, made up about equally between Holsteins and Ayrshires. Large cards showing age, breeding, and production records were placed over the mature cows. Over the heifers and bulls the card showed age, breeding and records of dams. Four Holstein cows were shown with average yearly records of 18,000 lb. of milk, the lowest yield being 15,500 lb. and the highest 22,800.

The Ayrshires, although not such heavy milkers, were exceptionally good cows and the whole exhibit illustrated remarkably well the highest type of dairy cattle.

One horse (Captain Aubrey), a handsome Standard Bred, was exhibited. He is a son of Peter the Great and has a racing record of 2.07¼. He is a large handsome bay horse standing over 16 hands high and weighing 1200 lbs.

The whole live stock exhibit attracted much attention, and was of great educational value.

QUEBEC

THE TEACHING VALUE OF FAIRS

BY H. NAGANT, EDITOR, JOURNAL OF AGRICULTURE

THIS year, as usual, the various divisions of the provincial Department of Agriculture had received instructions from the Honourable J. E. Caron, Minister of Agriculture, to prepare educational

exhibits for the Quebec provincial fair and arrange for practical demonstrations, in order to take advantage of the opportunity offered by the large number of visitors, and give all the information which the latter

might require regarding the management of the various branches of farming.

Similar exhibits, although not on such a large scale, were shown at district fairs, such as Sherbrooke and Montmagny, and lectures and demonstrations were given in a large number of county agricultural fairs.

QUEBEC PROVINCIAL FAIR

The main exhibits of the various divisions of the Department of Agriculture were displayed in eleven different halls or pavilions, all situ-

In the sixth pavilion, interesting demonstrations on canning were given by an expert, Mr. Grise. The packing of apples was taught in the seventh pavilion, which also contained collections of apples from the provincial fruit stations, and samples of beans, peas and corn from illustration fields. Information was given on the picking and grading of apples. The stand of the Provincial Entomologist was in the eighth pavilion. It included specimens of insect pests, as well as of insecticides and fungicides in general use. The



QUEBEC PROVINCIAL EXHIBITION, DEMONSTRATION IN KILLING FOWL BY AN EXPERT FROM THE PROVINCIAL DEPARTMENT OF AGRICULTURE

ated in the eastern part of the Industrial Palace. The centre pavilion, of a very neat design, was occupied by a miniature flower garden, surrounded by comprehensive collections of potted and cut flowers. Apple exhibits were shown in the second and third pavilions by the horticultural association and demonstration orchards. In the fourth and fifth pavilions, there were sprayers with barrels, hoses, bambocs, as well as a set of implements and tools for fruit growers.

ninth pavilion was devoted to school gardens, the products of these gardens, and contained a model agricultural school museum, etc. The tenth pavilion was filled with exhibits of the sugar schools of the province, including maple syrup, maple sugar, also bee culture exhibits, such as honey, wax, hives, etc.

The Cheesemakers' Co-operative Association of the province of Quebec had an exhibit of the products which it handles in the eleventh pavilion. Ham, bacon and lard coming from

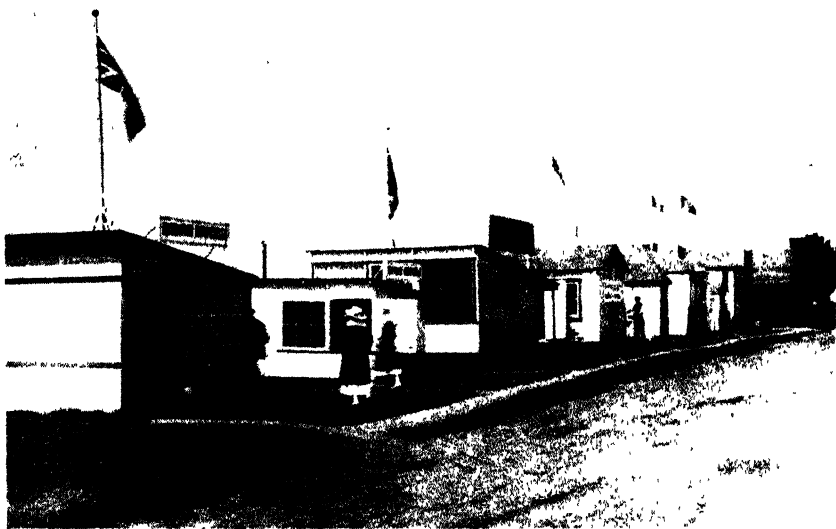
the cattle slaughtering schools of St. Valier and of Princeville were shown.

In the centre of all these pavilions, there was a general bureau of information, where the chiefs of the various branches of the Department, accompanied by their assistants, gave information and advices asked for by the public. This office was also the centre of distribution for pamphlets published by the provincial Department of Agriculture and dealing with the various branches of the agricultural industry.

The exhibit of Domestic Science

progress in the province of Quebec during the last few years.

At Quebec, a whole series of buildings (incubation rooms, where hundreds of chickens were hatched during the fair, brooders for natural or artificial rearing, model poultry houses, colony houses, fattening crates, etc.) enabled the instructors from the Department to teach the visitors the best methods of incubating and rearing chicks, the proper housing of fowls, fattening for the market, and all the operations of a well managed poultry house. A summary of the most useful indica-



QUEBEC PROVINCIAL EXHIBITION—DEMONSTRATION IN POULTRY HOUSING

schools and women's clubs, arranged by the provincial Department of Agriculture, was shown in the Arts Palace.

On the west side of the exhibition park, there was also a number of pavilions where demonstrations in bee and poultry keeping were given by experts.

THE TEACHING OF POULTRY-KEEPING

The poultry division participated in most of the provincial and county fairs. This industry has made great

tions was given in striking posters.

Demonstrations were also given at the district fairs by one or two instructors. They proved to be very interesting for the farmers.

In concluding we may say that the great development of poultry-keeping during the last few years in the province of Quebec is due in large measure to the practical teaching given at the provincial fair.

TEACHING OF BEE-KEEPING

The bee-keeping pavilion of the Department was very well equipped,

much better than in past years. A bee-hive in full operation could be seen. Everything was shown, from the old straw hive to the improved model hive, small hives for queen breeding, wax press, rolling press for wax combs, etc. Many bee-keepers

were interested in the silo for the wintering of bees. Demonstrations were given by the Department instructors. A number of professional bee-keepers were in attendance, closely following these demonstrations.

ONTARIO

THE PROVINCE'S AGRICULTURAL EXHIBIT AT THE CANADIAN NATIONAL EXHIBITION

BY C. F. BAILEY, B.S.A., ASSISTANT DEPUTY MINISTER

FOR some years past the Ontario Department of Agriculture has prepared an exhibit in the Government Building of the Canadian National Exhibition. Previous to this year it has been the practice to endeavour as far as possible to show the exhibition visitors the agricultural possibilities of On-

and with this in mind the exhibit was materially altered.

In the space set aside for the Ontario Department of Agriculture exhibit a booth was erected 11 x 42 ft. and was devoted entirely to "Thrift". Canning demonstrations, meat and flour substitutes such as cheese-dishes, war breads, etc., were dis-



SECTION OF ONTARIO GOVERNMENT EXHIBIT AT CANADIAN NATIONAL EXHIBITION

tario. This has been accomplished largely through the displays of high class fruit, vegetables, grain, etc. In view of the great need of increased production it was felt that the exhibit this year at least should be confined very largely to educational features,

played, and home gardens, war certificates and other matters relating to Thrift were presented. This booth was of special interest to consumers and was the centre of a great deal of interest.

In each corner of the space occu-

pied information bureaux were erected, each one devoted to a special class of agriculture. The Ontario Agricultural College occupied one booth, which was devoted to miscellaneous subjects which could not be classified. In all booths specialists were always on hand to give information dealing with their own particular line and were supplied with suitable demonstration material. Bulletins, agricultural reports and pamphlets dealing with subjects of special interest were supplied to those who made application.

In view of the importance of the potato industry and the difficulties encountered on account of scab and blight during the past year or two, demonstrations were given at timely intervals throughout the day in treating the seed for scab and also methods of preparing bordeaux for spraying potatoes. Demonstrations were also given for treating grain for smut. These demonstrations proved to be of special interest and were greatly appreciated by those who were present.

Large paintings suitably framed depicting various agricultural activities calling attention to the importance of improved agricultural meth-

ods formed a very conspicuous part of the wall decorations. While the exhibit on the whole was not as spectacular as in former years it was felt that it served a much more important part in encouraging production, which is of vital importance at this time.

The District Representatives of this Department stationed in the several counties of the province, conduct exhibits of a similar nature as the one here described, at the township and county fairs. The exhibits made by E. F. Neff in Norfolk county might be used as an example. A large assortment of bulletins on this subject were made available to visitors. Samples of jars of different kinds of fruit and vegetables attracted much attention. Practical demonstrations were given of methods of keeping fresh such vegetables as carrots, beets and celery by packing them in sand. Exhibits of corn in the ear of different varieties were tabled to show the difference in maturity of the different varieties. Poultry house and other poultry equipment were shown in miniature. Great interest is said to have been taken in all of these and more particularly in the corn variety demonstration.

MANITOBA

SEED GRAIN FAIRS AND DRESSED POULTRY SHOWS

BETWEEN 50 and 60 combined seed grain fairs and dressed poultry shows are being held in Manitoba and will continue to the middle of December.

Under the new Manitoba Agricultural Societies Act the prizes for the dressed poultry shows will be awarded

on a new basis. Instead of the Department of Agriculture giving special prizes, as in the past, it will pay in cash 60 per cent of the money actually awarded as prizes. In connection with the seed-grain show the Department awards 66⅔ per cent.

SASKATCHEWAN

AT THE INTERNATIONAL SOIL-PRODUCTS EXPOSITION

THE Saskatchewan display at the International Soil-Products Exposition and Dry-Farming Congress held in Peoria, Illinois, from September eighteenth to twenty-ninth, covered a space of sixty feet and consisted of sheaf and threshed grains, corn, fruit, vegetables root crops, forage crops, alfalfa, clovers, millets, native and tame grasses and other crops, such as hemp, buckwheat, hops, vetches, etc.

A feature of the exhibit was a mechanical arrangement showing a continuous stream of wheat in the shape of a waterfall. The fall of wheat was set in a painting representative of scenes in Northern Saskatchewan. The wheat fell on a revolving sphere, and the whole thing was designed to convey the idea of Saskatchewan's part in "breeding"

the world. Charts of an educational nature were placed in appropriate locations in the exhibit. One of these charts showed the value of sprouting potatoes before planting, another the effect on the yield of corn by planting at varying distances between the rows. Others indicated the difference in acre profits resulting from seeding at different times, at different rates, or on land differently tilled.

In the individual section, as recorded in the November number of THE AGRICULTURAL GAZETTE, page 994, Saskatchewan carried off two sweepstakes, fourteen first premiums, ten seconds and nine thirds. Saskatchewan as a province was awarded third place for the display of vegetables.

If it were not for the needs of our allies in Europe there would be no Food Controller in Canada at all. If Canada were isolated there would be no scarcity but a super-abundance of food supplies in this country. It is a supreme duty towards her allies who are bearing the stupendous burdens of this conflict that Canada is called to increase her food production to the utmost and to avoid waste if it would avoid defeat. For our European allies the business of the Food Controller is to enable these countries to live on what they can raise for themselves or import from America. It is a problem of conservation and distribution, for urgent necessities have already ensured the maximum of production. For Canada, on the other hand, the business of the Food Controller is to enable Canada to export the greatest possible amount of food. It is thence a problem of conservation and production. In England and France they are seeking to make the food supply suffice, in Canada we are seeking to make the surplus over what suffices as great as possible. The importance of this service cannot be exaggerated. The seriousness of the shortage which faces Europe is impressed upon all who know the situation. "Thy need is greater than mine"—this should be our response to every demand upon us, to every call to work and save, to every appeal to abstain or to sacrifice in order that our comrades across the seas may not suffer this last privation.—*Professor R. M. MacIver, in Canadian Courier.*

EXPERIMENTS WITH POTATO SEED

QUEBEC

MACDONALD COLLEGE

BY T. G. BUNTING, B.S.A., PROFESSOR OF HORTICULTURE

WE have been securing part of our seed in the past from New Brunswick and part from our own crops. From experience we have found that our land is not altogether suitable to potato culture, and the seed quickly deteriorates, so that after the first or second year the crops from our own seed are low and often badly diseased.

We have not conducted any special experiments along these lines, but have followed carefully the experiments conducted at other Stations, and at the present time we are firmly convinced that, in most cases, it is desirable for us to secure seed from such supplies as furnished by New Brunswick.

ONTARIO

BY DR. C. A. ZAVITZ, PROFESSOR OF FIELD HUSBANDRY

THE source of supply of potatoes and the stage of maturity at which the potatoes are dug exert a marked influence on the tubers for seed purposes.

SOURCES OF SEED POTATOES

In each of four years an experiment was conducted at the Ontario Agricultural College in testing, under uniform conditions, potatoes obtained from different sources. For instance, eighteen lots of Empire State potatoes were secured from eight different

sources, five being in the province of New Brunswick and three in Ontario. Seed potatoes grown about one hundred and forty miles north of Guelph in Muskoka district, near the Muskoka Lakes, gave a higher yield per acre than those obtained from any other source in each of the four years of this experiment. In one year there was some rot in the potatoes, and the results for that year were not satisfactory. The returns for the other three years were as follows:—

SOURCE OF SEED	1914	1915	1916
	Bush.	Bush.	Bush.
Old Ontario	166 5	114 4	220.3
Muskoka.	300 3	251.3	350.3
New Brunswick (Source 1)	205.4	235 5	232 3
New Brunswick (Source 2)	261 3	232.3	218.1

The average results show that the yield in bushels per acre for old Ontario was 167, for Muskoka 301, and for two sections in New Bruns-

wick 220 and 237 respectively. Somewhat similar results to those obtained at Guelph have been secured by other experimenters. Seed potatoes

grown in Scotland gave excellent results in the experiments conducted on the Experimental Farm of Cambridge University in England. Mr. W. T. Macoun, of the Central Experimental Farm, Ottawa, has obtained high records from seed potatoes produced at Indian Head, Sask. It is a common practice of some of the potato growers of the warmer climates to purchase their seed potato occasionally from a northern district possessing a cooler climate. Potatoes which are grown in a locality where the summers are comparatively cool, and where the tubers do not reach a full stage of maturity, give better results than the potatoes produced in a climate especially with a hot, dry period in July or August, and in which the potatoes become thoroughly ripened.

IMMATURE SEED POTATOES

An experiment was conducted at the College in each of four years in testing the value of immature potatoes for seed purposes. Six varieties of potatoes, comprising two each of the early, the medium, and the late kinds, were planted at intervals of two weeks, from May 31st until July 12th, and tubers of each variety were obtained from each of the four crops and all were planted about the first of June in the following year. The average of the four years' results in bushels per acre per annum from seed potatoes obtained from

each of four dates of planting, two early, two medium and two late varieties, showed that the more immature the potatoes were which were used for seed purposes the greater the yield of crop produced. The increase in yield per acre corresponds exactly with the immaturity of the tubers. Our various experiments have shown that immature potatoes have a special value for seed purposes. The superior value of northern grown potatoes is probably due to the fact that they are produced in a cool, short season and are harvested at an early date and before they are fully matured. The special value of seed potatoes grown at a high elevation could probably be explained in the same way. Somewhat similar results might be obtained in a warmer climate by using the second crop or immature potatoes for seed or by growing the seed potatoes on heavy damp land, in the shade of trees or under a mulch of from four to six inches of straw or of coarse manure. The results of experiments conducted in Nebraska have shown that seed potatoes grown under a mulch have compared favourably with seed potatoes obtained from a more northerly district. It should be remembered that the potato is an underground stem and not a seed. The study of immature potatoes for crop production has an important bearing on potato growing and particularly so in the warmer climates.

MANITOBA

BY JAMES A. NEILSON, DEPARTMENT OF HORTICULTURE

WE have not conducted experiments at the Manitoba Agricultural College to ascertain the influence of the maturity and sources of potato seed upon the crop produced. We have however, given the subject considerable study. It is becoming generally understood that northern grown seed

is superior in some respects to seed grown in latitudes farther south. The state of maturity seems to have some effect on the following crop. Some growers contend that immature seed will produce an earlier crop than fully matured seed. For this same reason I presume seed grown in northern regions is recommended for

planting in southern sections as it is liable to be more or less immature.

During the past spring I had occasion to prepare a small bulletin on potato culture. While engaged in gathering data for this publication I found some information which was rather interesting to me.

At the Rhode Island Agricultural Experimental Station, Dr. Hartwell and Dr. Damen have studied the effect, upon the yield, of early and late harvesting where potatoes were grown under the same conditions and were fertilized exactly alike. The first harvesting was made when the leaves were beginning to die and the last one when the vines were practically dead. The following are the

results of the experiment:—

Date of Harvesting	Bushels per Acre
Seed	
July 11th.....	162
" 31st.....	338
Aug. 5th.....	371
" 12th.....	393

It will be seen from this table that the crop was nearly $2\frac{1}{2}$ times as great when the potatoes were allowed to mature as it was when it was harvested when the leaves were just beginning to die. In northern regions, where the growth of potatoes is likely to be stopped by frost, the hastening of maturity, whether by proper fertilization, cultivation or budding, is likely to be an important factor in increasing the final yields.

QUEBEC

THE STUDY OF VETERINARY SCIENCE

BY CHAS. H. HIGGINS, B.S., D.V.S., PATHOLOGIST

THE consideration of the subject of Veterinary Science in Canada would not be complete without mention of the Montreal Veterinary College, which was established in 1866, and later became the Faculty of Comparative Medicine and Veterinary Science of McGill University.

AN OUTLINE OF VETERINARY PROGRESS

Late in the fifties of the last century, the subject of Canada was beginning to be a topic for discussion among the students of the Veterinary Colleges in Britain. It was about this time that the late Dr. Andrew Smith migrated to Canada, settling in Toronto, where he established what is now known as the Ontario Veterinary College. Shortly after this an inquiry was sent to the Royal (Dick) Veterinary College of Edinburgh for a graduate who would be able to undertake the practice of his profession in an Ontario locality. The man selected for this mission,

by the then director of this school, Professor Dick, was Dr. Duncan McEachran, who is now so well and favourably known as a veterinarian of eminence, not only on the North American continent but throughout the world.

STORY OF THE SCHOOL

Shortly after Dr. McEachran's arrival in Canada he identified himself with the Ontario Veterinary College, which was then a private enterprise. Not feeling satisfied with the outlook for higher veterinary education he severed his connection with this school and located in Montreal, where he established the Montreal Veterinary College, and this school may be said to be the pioneer for higher veterinary education on the North American Continent. This institution was established in 1866 and maintained a three-year course before a similar curriculum was required by an English-speaking school. After a successful career of many

years, during which period there were graduated a number of well-trained practitioners of veterinary medicine and some who have since risen to high distinction in their profession, the Montreal Veterinary College was absorbed by McGill University and became, as previously stated, the Faculty of Comparative Medicine and Veterinary Science of that institution. The ideals of this school were high at a time even when veterinary education in Canada was in its infancy. During its later years, owing to a change in the curriculum of the medical school of the University, difficulties presented themselves in connection with the courses available for students in Comparative Medicine. These difficulties with the lower entrance requirements of other schools and the absence of endowments made it desirable to discontinue the course.

In recent years there have been a number of attempts to re-establish this school as an integral part of McGill University with adequate provision for laboratories, hospitals for large and small animals and the other accessories required to provide proper training facilities. The war, however, will undoubtedly delay action in this regard for a further indefinite period.

HIGH STANDARD OF THE INSTRUCTION

During its existence the school required an adequate matriculation examination and the courses of in-

struction were of a very high order. The members of the faculty laboured for high ideals rather than for adequate financial remuneration. Such ideals naturally precluded the probability of a large attendance, as quality and not quantity was the aim.

The work accomplished by the school is reflected by the prominence which the graduates enjoy wherever they may be located. The present Veterinary Director General for Canada, Dr. F. Torrance, who is president of the American Veterinary Medical Association, the largest association of the kind in the world, is a graduate of this school. Other examples could be cited but would not speak more effectively for the training which the school gave than the average graduate wherever he may be found.

The degree given by the original school, the Montreal Veterinary College, was V.S. (Veterinary Surgeon), but after affiliation with McGill University the degree carried an added significance and was D.V.S. (Doctor of Veterinary Science). This was the first school within the British empire to confer the doctorate degree upon a veterinary graduate. So favourably was this school considered by the British authorities that its graduates were permitted to practice in Great Britain before a similar privilege was granted to the graduates of any other colonial institution. It is to be hoped that this school may be revived and continue on its high idealistic career.

ONTARIO

THE WINTER FEEDING OF LAMBS

BY J. P. SACKVILLE, B.S.A., LECTURER, ANIMAL HUSBANDRY, O.A.C.

IT is pretty generally recognized that in order to secure the maximum returns from animals offered for sale they should go to the market in prime condition. From a national standpoint it is possibly of more importance at the present time on account of the world-wide shortage of meat that all animals should be finished reasonably well, as every pound of extra flesh added increases the available supply to just that extent. Further, the superior quality of well-finished animals usually brings its reward in an enhanced price.

Having regard for these facts and keeping in mind that the supply of feed throughout Ontario this year is fairly plentiful, it is quite possible that some farmers are arranging to hold over their lambs to finish for the market in January or February. Not a few lambs are being marketed this year in thin condition, as a visit to the larger markets will reveal.

NOTES OF REQUIREMENTS

The following notes on feeding and general care should give satisfactory results provided judgment is used in applying them.

There is this to be said in favour of the policy of winter-feeding lambs, it absolutely means the male lambs must be castrated, which in itself would be of great educational value in flock management.

The ration to feed will depend largely upon the feeds available, which on most farms consists of clover or alfalfa hay, and roots, and silage, and home grown grains such as barley and oats. Barley and oats have given satisfactory results, in fact barley compares very favour-

ably with corn, which is considered one of the best fattening grains to be had. The addition of oats tends to make the ration rather more palatable, and, particularly at present prices, would cheapen it somewhat.

The amount of grain to be fed will of necessity depend upon the length of the feeding period, and the condition of the lambs. As a rule it will require from sixty to ninety days' feeding to bring the flock up to a proper finish. It is very important not to feed too heavily at first, and bring the lambs up to full feed without at any time overdoing it. A set-back of a few days by overfeeding is serious, as much valuable time is wasted before they again commence gaining.

PROGRESS AND METHODS

For the first fifteen days not more than $\frac{1}{2}$ lb. of the grain mixture should be fed. This could safely be increased until at the end of the first month they would be getting from $\frac{3}{4}$ lb. to 1 lb. per lamb per day, depending upon the length of time to be fed. Gradually increase this amount up to say $1\frac{1}{2}$ lb. each, when they would be on full feed. At no time should it be necessary to feed over this amount.

At the commencement of the second month the grain ration could be made up of $\frac{1}{4}$ lb. of oil cake. This would, of course, increase the cost but would tend to put on a superior finish. No better use can be made of screenings, made up in many cases of weed seeds mixed with broken and shrunken grain, than by feeding it to lambs. The writer has in mind a flock of lambs that were well finished

and no other grain than screenings were used. In case any are available they could be fed alone or mixed with the grain ration.

Well cured clover or alfalfa hay, along with some roots and with the grain ration suggested above, should bring the lambs up to a good finish in from two to three months. As a rule, not more than from 1½ lb. to 2 lb. of hay will be consumed per head. The addition of roots adds to the succulency, as well as providing variety to the ration. Where roots are not available good quality silage could be substituted, the roots or silage to be fed at the rate of from 4 lb. to 6 lb. per lamb, per day.

HOUSING AND MANAGEMENT

In addition to the ration to be fed, the question of housing and general management is an important factor. In order to make satisfactory gains the quarters should be reasonably roomy, dry, light and of a proper temperature, which for sheep means fairly cool. To further make the flock comfortable, they should be dipped before being put into their feeding pens, as tick-infested lambs will not make satisfactory gains. It is scarcely necessary to mention that water and salt should be supplied regularly. Where fairly well-bred vigorous lambs are being handled a gain of around 2 lb. each week might be expected.

SPECIALISTS MEET TO DISCUSS POTATO SITUATION

BY JUSTUS MILLER, B.S.A., ASSISTANT COMMISSIONER OF AGRICULTURE

A CONFERENCE of potato specialists and growers was held at Toronto on October 30th and 31st. The meeting was called by Dr. G. C. Creelman, Commissioner of Agriculture. There were present potato disease specialists from the Departments of Agriculture of the United States, the Dominion of Canada and the Province of Ontario, federal and provincial seed specialists, vegetable growers, and District Representatives.

PHASES OF POTATO INDUSTRY

All phases of the potato industry affecting Ontario were thoroughly discussed, the following receiving special attention: standardization of varieties; potato diseases—nature, spread, injury and control of leaf roll, mosaic, curly dwarf, leaf streak, wilts, tip burn and rhizoctonia; seed supply for Ontario—best sources of supply and best means of getting growers to secure seed from those districts; production—methods of cultivation, fertilizers, potato machinery, spraying and storage; grading, marketing and introduction.

Two questions that received much attention were the desirability of northern grown seed potatoes and the spread, injury and control of several comparatively newly-discovered diseases which have apparently become widely established in old Ontario. To secure accurate information regarding these questions an investigation was made last summer by the Ontario Department of Agriculture. Farmers were visited in every potato-growing district in New Ontario and in the three counties in old Ontario where potatoes are grown most extensively. In each case a thorough examination of the growing crop was made.

DISASTROUS DISEASES

At the conference the results of this investigation were given. Briefly summarized, the report was as follows: While but one case of leaf roll was found in Northern Ontario this disease was very prevalent in all districts visited in old Ontario. In only two fields in these latter districts was none of the disease observed, in several the percentage was not large,

but in many over 50 per cent was found. Since 8 per cent is considered by pathologists to be serious, and as plants diseased with leaf roll yield but one half to one third a normal crop by weight, and the tubers from such hills are mostly unmarketable, this prevalence of disease, it was thought, might account for Ontario's small average yield during the past 35 years of 116 bushels per acre.

Mosaic seems fairly evenly distributed over the whole province, but the percentage is small. It is not so serious a disease at present as leaf roll, and has not yet greatly reduced yields. Immediate steps must be taken, however, to arrest its development and spread in the province.

None other of the so-called physiological diseases were observed to any extent in the province, and apparently have not yet become established except in isolated cases.

Blights are much more prevalent in old Ontario than in the North, while the Colorado Beetle is not at all established in two northern districts.

NORTH ONTARIO'S SEED SUPERIORITY

All told, four times the amount of serious disease and ten times the amount of less serious disease was found present in old Ontario than in Northern Ontario. Throughout the North, generally, the crop was also much more vigorous, and far larger yields prevailed.

So far as the investigation was carried there can be no doubt that it proved Northern Ontario to be far superior to old Ontario as a source of first-class seed potatoes. The districts which appealed most to the investigators as sources of seed supply were as follows: Thunder Bay, Algoma, Nipissing, Parry Sound and Muskoka. Mr. G. W. Collins, District Representative for Thunder Bay, estimates that in that district alone between 500,000 and 1,000,000 bushels of choice seed potatoes might eventually be produced.

In discussing these so-called physiological diseases the evidence of all the pathologists present went to prove that leaf roll and curly dwarf are both communicable and hereditary, while the opinion was that mosaic probably was communicable and certainly hereditary. There was no evidence given to prove that these diseases contaminated the soil.

It was the opinion of those pathologists present that there was little hope of ridding old Ontario of its most serious potato disease—leaf roll—by selection; that the only remedy would be the importation of disease-free seed potatoes from unaffected districts. As all were of the opinion that in a district subject to dry periods with hot nights these diseases either originated through impaired vitality or were developed by specific organisms not yet isolated, the sources of seed supply for old Ontario, therefore, would have to be located in northern districts preferably in Northern Ontario.

In this connection no evidence was available to prove how long such seed could be re-planted in old Ontario before these so-called physiological diseases became established. Mr. W. T. Macoun, Dominion Horticulturist, was inclined to believe that it would pay our farmers to import disease-free, vigorous seed from Northern Ontario each year, but would not go on record as definitely advising this. He suggested that experiments be conducted at once to prove the point.

It was emphasized by Mr. P. Murphy, Dominion Laboratory of Plant Pathology, Charlottetown, P.E.I., that while these diseases would not originate in Northern Ontario, due to the climatic conditions which prevail there, yet they would readily develop and spread from diseased tubers if these were imported from contaminated districts and used for seed. In this way he explained the small percentage of mosaic—in a few cases the percentage was high—which exists. He

advised a very careful and thorough inspection of these fields in order to prevent the contamination by disease of this important source of supply.

CONTROL OF DISEASES

The general consensus of opinion regarding the control of these diseases was as follows:—

(1) To encourage the planting in old Ontario of disease-free, vigorous, northern grown seed, preferably from Northern Ontario.

(2) To initiate a scheme of inspecting Northern Ontario potato fields, roguing out disease and impurity, hill selecting the best plants for seed and certifying as to the character of seed potatoes exported to southern districts. In this connection the production of high quality seed potatoes for planting in old Ontario was not alone considered, as Northern Ontario may very well become a source of supply for portions of several of the States of the Union.

(3) To conduct a survey in old Ontario to ascertain the full extent to which serious diseases have become established, and to eliminate as seed (by education) all stock infected with inheritable disease.

NORTHERN GROWN SEED

Dr. W. A. Orton, United States Department of Agriculture, Washington, declared that all experiments and practical experience in the United States confirmed the belief that those districts where a comparatively cool, moist climate prevailed, with long days of sunlight during the growing season and cool nights with heavy dews, were especially adapted to the production of highest quality seed potatoes. Northern Ontario, he believed, measured up extremely well to these qualifications. Where less favourable conditions prevailed—as in old Ontario and the majority of the States—a large yield of commercial potatoes might be secured, but weather conditions impaired the vitality of the tubers and gradually made them unsuitable for seed. In many potato-growing districts of the United States seed potatoes were secured each year from Maine, Wisconsin and the Maritime Provinces. He was of the opinion that the

favourable climatic conditions enumerated were responsible for the virtue of the seed stock rather than the immaturity of tubers grown in these districts. A light soil, he believed, was superior to heavy soil for seed production. In conclusion, he gave it as his belief that the yields throughout old Ontario could easily be increased 100 per cent by the planting of northern grown seed and the general practice of skilful cultural methods.

Mr. W. T. Macoun and Dr. C. A. Zavitz, Ontario Agricultural College, each gave convincing reports of their experiments in proof of the high yielding quality of northern grown seed potatoes. The former had increased yields from under 100 bushels to over 300 bushels per acre with the same variety and exactly the same environment by importing seed from the Maritime Provinces and from the North-west. The latter had planted seed from the Maritime Provinces, Northern Ontario and old Ontario under exactly similar conditions for five years, and each year Northern Ontario seed had led in yields, with the Maritime Provinces seed second and old Ontario third. Both experts agreed that immature seed grown in old Ontario gave much heavier yields than matured seed, but both favoured the development of a seed potato trade between Northern Ontario and old Ontario.

IMMATURITY OF SEED INCREASES YIELDS

With but one exception all the practical growers present at the conference who had had experience with northern grown seed concurred in the opinion that it was preferable to old Ontario seed potatoes.

COMMITTEE APPOINTED

After the conference the following committee was formed to make recommendations to the Commissioner of Agriculture regarding the immediate and permanent improve-

ment of the potato industry of the province:—

Dr. C. A. Zavitz, Ontario Agricultural College, Guelph, chairman.

Justus Miller, Asst. Commissioner of Agriculture for Ontario, secretary.

R. S. Duncan, Supervisor of District Representatives, Ont. Dept. of Agriculture.

F. C. Hart, Director, Ont. Co-operation and Markets Branch.

Professor J. E. Howitt, Ontario Agricultural College, Guelph, Ont.

S. C. Johnston, Chief, Ontario Motion Pictures Bureau.

G. Collins, District Representative, Ont. Dept. of Agriculture, Thunder Bay District.

P. Murphy, Dominion Laboratory of Plant Pathology, Charlottetown, Ont.

G. C. Cunningham, Dominion Laboratory of Plant Pathology, St. Catharines.

L. H. Newman, Secretary, Canadian Seed Growers' Association, Ottawa, Ont.

T. G. Raynor, Dominion Seed Inspector for Eastern Ontario.

After due deliberation the committee submitted the following recommendations:—

EXTENSION WORK OUTLINED

(1) *Re The Standardization of Varieties for Ontario.*

That in view of the large number of varieties grown in the province and the quantities of impure seed planted annually in consequence:—

(a) The Irish Cobbler be especially recommended as a standard early variety to be grown generally in Ontario for commercial purposes and the Early Ohio be recommended as an extra early variety to be grown on a limited scale by market gardeners in those localities where a very early variety is required to take advantage of a special market.

(b) The Green Mountain be specially recommended as a standard late variety to be generally grown in old Ontario for commercial purposes and certain other late varieties notably Carman No. 1,

Dooley, Rural New Yorker No. 2, etc., be recognized as standard varieties and be recommended for those districts where conditions are peculiarly favourable for their growth.

(c) These specialists do everything in their power to give the individual potato growers all information possible regarding the eradication of disease and the best methods of potato crop improvement while roguing fields, and that they also assist as far as may be possible in the educational campaign, hereinafter recommended.

(3) *Re Securing Northern Grown Seed Supplies for old Ontario Farmers.*

That in view of evidence from many sources regarding the superiority of Northern grown seed potatoes:—

(a) The Ontario Government proceed at once to buy a quantity of the best northern grown potato seed available, preferably from Northern Ontario, to be used for experimental and demonstration purposes in old Ontario next year.

(b) The Ontario Government at once make plans to aid farmers and growers to locate the best northern grown seed potatoes preferably from Northern Ontario, in car-load lots for next spring's planting.

(4) *Re The Establishment of a Government Source of Supply of the Highest Quality Seed Potatoes Grown in Northern Ontario.*

(a) That a part of one of the farms, or parts of several of the farms in Northern Ontario now owned by the Ontario Government, be used as a source of supply of the very highest quality of seed potatoes, and used also as a station or station for potato improvement work.

(b) That as soon as possible the Ontario Government buy a quantity of the best potato seed available in Northern Ontario to be planted next spring on the acres of land set aside for the purpose, the resulting crops to provide: (1) material for selection in improvement work, (2) choice seed to be used by District Representatives for school fairs and demonstration purposes, (3) seed to be used for the Experimental Union in co-operative experiments, (4) seed to be used for all other experimental and demonstration purposes in old and Northern Ontario, (5) seed for planting on those farms in old Ontario owned by the Ontario Government which are best adapted to potato growing, these farms in turn to become sources of seed supply for the surrounding districts, (6) seed of a particularly high guaranteed quality to be sold to potato seed growers co-operative societies as foundation stock.

(5) *An Educational Campaign.*

(a) That the Ontario Government at once initiate an educational campaign, using

all educational and publicity agencies at its command, and, if necessary, creating new agencies, to the end that potato growers be fully informed of the seriousness of some of the diseases prevalent in the province; that the growers in old Ontario be made cognizant with the desirability of seed potatoes grown in Northern Ontario and be encouraged to purchase the same and that farmers and growers in all districts be stimulated to as rapid an improvement of the potato industry as possible.

(b) That in this connection the Ontario Government make plans to begin next spring a series of experiments and demonstrations widely spread over old Ontario to prove in a forceful and convincing way the high yielding and relatively disease-free quality of seed potatoes grown in Northern Ontario.

(6) *A Committee to Study Grades and Grading.*

(a) That a committee be appointed at once by the Ontario Government to suggest setting some standard grading of potatoes if such a standard, after investigation, be deemed advisable.

(b) That the Ontario Government suggest to the Federal Government the desirability of setting such standard grading for the Dominion as may be decided by the committee.

(7) *A Potato Specialist.*

(a) That a man be appointed at once by the Ontario Government to have charge of all potato extension work in the province, to co-ordinate the efforts of all agencies heretofore suggested, to organize the whole improvement scheme in its broader phases, to prevent duplication of work in any form, to direct all educational and publicity campaigns and to supervise all literature concerning any phase of the potato industry which may be published for distribution by the Ontario Government. This man, in short, would be responsible for all work undertaken by provincial officials in connection with the potato industry, and for the close co-operation and co-ordination of effort of all those engaged in the work.

(8) *An Advisory Council.*

(a) That an Advisory Council be appointed to enable the potato specialist to work efficiently and without friction; this Council to consist of not more than six men who would meet regularly to confer with the potato specialist.

(b) That this Council would represent every interest comprehended in this scheme of potato extension work, including the practical growers.

(c) That at these meetings of the Advisory Council the policy to be followed along lines heretofore enumerated as within the scope of the duties of the potato specialist would be decided by mutual agreement.

BETTER FARMING SPECIAL

THE Ontario Department of Agriculture, in co-operation with the Grand Trunk Railway Company, is operating a better farming special train over the lines of the Grand Trunk Railway between Toronto and Cornwall. This work is financed from the funds provided under THE AGRICULTURAL INSTRUCTION ACT. The cars are equipped with exhibits including motion pictures of approved methods of agriculture, including drainage, fertilizers, seed production and cropping,

poultry and live stock feeding and management, water supplies, etc. An efficient staff accompanies the train to give addresses and conduct demonstrations. At a number of points evening meetings are held in public halls. The train commenced at Cornwall on November 27th and will conclude at Agincourt on December 21, making stops at the principal towns west as far as Port Hope, then detour to Millbrook, Peterboro and Lindsay and then on to Agincourt.

DISTRICT REPRESENTATIVE ACTIVITIES

PLOUGHING COMPETITIONS

IN the County of Peterboro ploughing competitions have been held this autumn on the several farms of the competitors. The competition was organized by Mr. F. C. McRae, District Representative. The competition was open to all ploughmen in the county. Competitors were required to plough at least five acres in stubble. They were privileged to use any kind of plough. Thirteen ploughmen entered the competition and eleven competed. The judges used the following score card:—

Crown.	20
Straightness	15
Evenness of cut	20
Evenness of depth	20
Covering of grass and stubble	20
Finish.	20
General appearance.	20
Total	135

Five prizes were offered. 1st, \$15; 2nd, \$12; 3rd, 10; 4th, \$8, 5th, \$5. Both old and young competed. This competition gave impetus to the county match which was held at a later date.

THE PAYING OF SCHOOL FAIR PRIZES

In the county of Dufferin, Mr. H. A. Dorrance, District Representative, has adopted a new method of paying the prizes to the winners at the school fairs. Instead of taking the time to visit the various schools and paying the prize money as had formerly been done, this year a money order was issued in favour of the teacher for the amount won by her pupils and with it was enclosed a statement of the winnings and a request that the teacher allot the awards. This plan not only expedited the payment of prizes, but it secured the co-operation of the teacher in a work in which she is keenly interested.

A SCHOOL FAIR PARADE

At the school fair held in Morrisburg the parade proved to be the most interesting feature. The children marched to the music of an orchestra, and the general deportment and marching ability exhibited would be hard to excel. The parade serves to give the people an idea of the number of children taking part in school fair work in the particular township represented. The impression thus gained makes it easier to collect contributions for prizes. While the parade was in progress an interested citizen went among the people and collected \$15 which enabled each school taking part to secure a prize. The parade has the other valuable feature of taking the children away from the exhibits while the judging is in progress.

TEN LESSONS IN AGRICULTURE

At the School Teachers' convention held at Mount Forest in Wellington county, Mr. R. H. Clemens, District Representative, outlined a scheme whereby the teachers could put on ten lessons in agriculture. The scheme provides one lesson a week for ten weeks, as follows:—

First lesson—Testing seed.

Second lesson—On soils, using a lamp glass full of dry sand to demonstrate capillary action.

Third lesson—On weighing milk, using a spring scale and a pail in estimating the difference in the value of cows.

Fourth lesson—Churning, with stress placed on ripening the cream, which, if properly understood would reduce the hours of churning very materially in many farm homes.

Fifth lesson—The horse's foot, showing the hoof and describing the parts.

Sixth lesson—Manual training.

Seventh lesson—Entomology, for which the children would gather cocoons, fallen plums, etc.

The eighth, ninth and tenth lessons are of corresponding character.

At the end of ten weeks it was proposed to have an agricultural night in the school, ten children to take part. The first boy would explain what happened to the cocoon and would tell about the life history of the plum curculio in a three-minute speech. The first girl would give her experience and the experience of others in churning butter. The second boy would explain the different parts of a horse's foot and their function; some other children the seed testing experiment, and so on, until the ten lessons had been dealt with by the pupils. Some of the older children, it was proposed, should follow in the social part of the evening with entertainment. It was further proposed that the teacher should explain the necessity of having a good agricultural library in the school for the use of the people in the section. She would appeal for contributions towards the purchase of the necessary books, and would thus begin the formation of an agricultural library. The teachers at the convention heartily approved of the proposed plan. Mr. Clemens promised his co-operation to the extent of supplying the teachers who desire to take up the work an outline of each lesson one week in advance.

VISITS FOR CONSULTATION

During two weeks Mr. A. P. MacVannel, District Representative of Prince Edward County, received 130 callers at his office who came in to consult him concerning the poultry show, Board of Agriculture, the purchase of sheep, diseases of poultry, farm tractors, school fairs, Government assistance with reference to the transportation of breeding and feeding stock, dairymen's association meeting, the identification of apples, the Fruit Marks Act, etc.

POULTRY ASSOCIATION FORMED

In the county of Haldimand a poultry association has been formed, having for its motto "More and Better Poultry." The association has a membership of upwards of seventy-five and others in prospect. It holds monthly meetings at which pre-arranged programmes are carried out. At a recent meeting a class of utility poultry judging was conducted by Mr. J. W. Clark of Cainsville, brother of the Seed Commissioner. The birds in the class were donated to the association, and after the demonstration was completed the birds were auctioned off to the highest bidders, the receipts going into the funds of the association.

ORGANIZING FOR SHORT COURSES

BY J. W. STARK, B.S.A., DISTRICT REPRESENTATIVE, PEEL COUNTY

THE first announcement of the short courses in agriculture and domestic science to be held in January was made at the board of agriculture meeting held in the town hall last February, and we made use of every opportunity to keep the matter before the attention of the people in that district, through mentioning it when speaking to the pupils in connection with

the distribution of school fair material at garden parties during the summer, at the school fair, and to the women's institutes and farmer's clubs. There has been no paid newspaper advertising in connection with this course, although we got considerable publicity by newspaper articles. First, I wrote one announcing that we would hold the course in the Ebenezer district if enough young people could

be guaranteed to attend, and this article also gave general explanations in connection with the two courses. Two weeks later there was an announcement in the paper of the organization meeting that was to be held, and then after the meeting we gave it a full write up in the local papers. Although the meeting was held on rather a rough night, the attendance was very good, and at the conclusion of the meeting, when we called for all those who expected to be able to attend to stand up, we got 26 names. It is expected, of course, that the canvass being conducted will increase this number further still. I think the main thing in working up these courses is to secure the assistance of the best and most influential men in the district and get them to do the boosting. We were able to do this to our satisfaction this fall, and men drove long distances to speak at the meeting to help it along. Within three days after this organization meeting was held, three farmers from different sections of the township came in to apologize for not being at the meeting that night.

NOTE.—The short courses being arranged by Mr. Stark in Peel county correspond closely with courses to be held in most of the counties in Ontario this coming winter. The agricultural course will commence on January 8th and finish the 1st day of February. The domestic science course will take place from January 21st to February 1st. The agricultural course will include studies on live stock,

dairying, feeds and feeding, veterinary science, field crops, poultry, fruit growing, vegetable growing, soils and cultivation, fertilizers and manures, farm drainage, bee-keeping, insects and plant diseases, weeds and weed seeds, bacteriology, co-operation and markets, farm management, arithmetic and business correspondence, farm buildings, and public speaking. The subjects to be taken in the domestic science course are vegetables and fruit canning, milk, cereals and cheese, meat, meat substitutes, war breads, simple desserts and salads. In the announcement of the courses Mr. Stark presents an appeal to prospective students which may be suggestive to extension workers throughout Canada.

AN APPEAL

Tom Hyde, the tinker, when asked just before his death if he had anything to say, replied, "Tell the tailors to remember to make a knot in their threads before they take the first stitch."

There are a great many things that are begun and finished in a day or a week or a few years and if we make a mistake we can often fix it up again. But we make our start in life just once. Let us see that the first stitch holds, for then we shall be sure that the whole fabric of our later life will be strong.

Never before in the history of the world has there been such a demand for well trained, efficient young men and women as there is right now. Canada will also in the years that follow the war need men and women who have been thoroughly equipped for the business in which they are engaged. It is our privilege and our duty to take a good first stitch now by preparing ourselves for the very best service.

These short courses are planned expressly to meet the needs of those who wish to know the newest and best things in farming and homemaking, but who are unable to leave home long enough to take an extended college course at Guelph.

MARKETING HOGS CO-OPERATIVELY

BY WALTER H. SMITH, B.S.A., DISTRICT REPRESENTATIVE, LEEDS COUNTY

AS forecasted in the September number of THE AGRICULTURAL GAZETTE, the several agricultural co-operative organizations in the county of Leeds have been co-ordinated into a county-wide organization. After organization, one of the first undertakings was to commence the co-operative marketing of hogs. In this we have made a

very satisfactory beginning. Up to October 20th we have marketed four car loads with excellent results. Our Rules and Regulations are very simple. They merely consist of regulations by means of which the hogs are to be sold on a graded basis. Hogs graded select, that is, of bacon type between the weight of 170 and 220 lb., are paid for at the top price,

while 50c per 100 is taken off on hogs that are too light, the same cut being made on extremely fat hogs. Extra heavy hogs are sold according to market specifications for their respective classes. As a result of the organization, we have been able to pay our members an advance over regular market prices at local points at from 25c per 100 lb. to \$1.20 per 100. We have also benefited non-members due to the fact that since our co-operative shipping has been inaugurated, local buyers are following the market considerably closer than had been previously the case. Non-members are receiving approximately 50c to \$1.00 per 100 more for their hogs from competitive buyers.

We have had the experience of local buyers endeavouring to break our association, and this has been a good thing for non-members, and has in no way shaken the confidence of our members in the work of the association. We realize that our organization is not perfect, and we intend to improve our system as occasion demands.

GRADING AND SHIPPING

At the present time we are selling our hogs f.o.b. shipping point. There is an understanding between the packers and our Co-operative Association that the District Representative be responsible for the grading and the valuation of the hogs shipped. We have had no difficulty with any of our farmers finding fault with our grading, and consequent cuts, nor have we had any complaint from the

packers in regard to the class of stuff shipped in their respective grades. As intimated in our constitution, and a point that is always kept before the members, is quality is our aim. Only by marketing a superior class of stuff do we hope to obtain advanced prices, and all our work is done with this end in view.

Practically all the information in connection with loading the car, giving prices and sales, is done by our local manager over the telephone. The members keep our manager posted as to when their hogs will be fit to ship, and the members are given an opportunity to ship in turn as the hogs are finished. To date we have had no difficulty in getting almost the exact number of hogs required for our car. The manager knows in advance just who is going to bring in hogs on the certain date, consequently we have not had to overload our cars, nor to turn back any members who have brought in pigs.

The hogs are all paid for when delivered. The local weigher does all the weighing. We believe it in the best interest of the Association to have the weighing done by an impartial man in no way connected with the association.

We find it is not necessary to charge much commission in connection with the hog shipping propaganda, and if at the end of the year there is any surplus as result of these commissions, it will be divided among the shippers in proportion to the value of hogs marketed. I might state that all hog quotations to members are net at the car.

SALE OF AGRICULTURAL COLLEGE LIVE STOCK

THE annual sale of live stock of the Ontario Agricultural College was held on November first. The offerings consisted of Shorthorn, Holstein, Ayrshire, Jersey and fat cattle and Yorkshire swine. All, with the exception of a few cows,

were young animals. The short-horns were divided into two classes, beef and dual purpose.

Of the beef shorthorns, nine animals were sold, six of which were males, which brought an average price of \$322.50, the highest price

being \$450.00 for College Diamond. The three females sold respectively for \$1100, \$600, \$365, the highest priced animal being Augusta Snowdrop

Of the dairy Shorthorns, three males and two females were sold. The bulls brought an average price of \$140.00, the highest being \$185.00. The females, Puddington Solo and O.A.C. Waterloo Baroness 3rd, sold for \$525 and \$475 respectively.

Of the Holsteins, three only were males. These sold for \$250, \$100 and \$80 respectively. Eight Holstein females were disposed of, bringing an average price of \$169.68³/₄. The highest price was \$225 for Beauty of O.A.C. 3rd, having a Record of Performance record at five years of 14,808 pounds of milk and 648 pounds of butter and a Record of Merit of 18.13 pounds of butter in seven days. The heifer calf, Mollie

Rue Rattler 3rd, was purchased by the School of Agriculture, Kemptville, for \$152.50.

The Ayrshires sold consisted of four males and two females. The males brought an average price of \$55.62¹/₂, the highest price being \$70 for the yearling Floss 5th Masterpiece. The females, Bud's Minnie and Floss' Guarantee 2nd, were sold respectively for \$155 and \$150.

The Jerseys disposed of were three young bulls that sold respectively for \$80, \$75 and \$55.

The two fat cattle sold brought 19c and 20c per pound respectively.

The Yorkshire sale was made of twenty-nine sows which brought an average price of \$61.38, the highest price paid being \$95. for O.A.C. 2770. Her litter mate, O.A.C. 2772, was purchased by the Kemptville School of Agriculture at \$72.50

MANITOBA

THE VALUE OF SWEET CLOVER AS A FEED

THE economic value of white sweet clover has frequently been called into question. That it will produce heavy crops of hay is admitted; that it possesses much feeding value for animals that eat it is also universally conceded; that it is a comparatively hardy crop is attested by the fact that it will often reseed itself and live in the same spot for years; that it has possibilities as a weed fighter is accorded by those who recognize its vigour of growth; but as to whether it is sufficiently palatable to cause animals to eat it from choice is the question.

The Manitoba Agricultural College has been experimenting with this crop, and they are now able to say that their cattle have both been pasturing upon it and are heartily eating it as hay. The advocates of sweet clover contend that many animals must acquire a taste for the plant, and after that they are fond of it. This seems to be the experience at

the College this year. In the pasture field was an area of sweet clover, and another area of alfalfa. During the early summer the cattle pastured down the alfalfa but scarcely touched the sweet clover. The latter was then cut for hay. Later in the season the alfalfa was short in growth, and the green second growth of sweet clover was attacked by the cattle with the result that after they had acquired the sweet clover habit they pastured continuously upon it for the remainder of the season. Whether or not the same cattle will eat sweet clover with the same avidity next spring will be watched with interest. The College has never had any difficulty in having animals eat the sweet clover hay.

The particular patch of ground used to grow this sweet clover was an unsatisfactory plot that had refused to grow grain and corn, and was sown to sweet clover in an effort to find some crop that would succeed.

SHORT COURSES IN FARM ENGINEERING

THE Eleventh Annual Short Course in Farm Engineering for threshermen and farmers will begin at the Manitoba Agricultural College on Tuesday, January 15th, 1918, and continue until Friday March 15th. Students attending must be at least eighteen years of age. The course will include gas engine work, steam engines, boilers, forge shop, farm mechanics, concrete construction, building construction, farm machinery and physics.

The large engineering building, in

which the course will be held, is admirably equipped for teaching the work suggested. It is U shaped, has three full stories and has a frontage of 160 feet and a depth of 110 feet.

Students from Manitoba will be required to pay a registration fee of twenty dollars. Students from outside provinces will be charged a fee of twenty-five dollars. Students can obtain board and room in the college residence at five dollars per week. No more than sixty-four students will be accepted for the course.

SASKATCHEWAN

THE LEGISLATURE APPROVES HOG PRODUCTION CAMPAIGN

THE Saskatchewan Department of Agriculture and the University of Agriculture of the province are actively engaged in furthering the increase of the raising of hogs. They have been greatly heartened by the adoption of the following resolution by the legislature of Saskatchewan, which has been in session since Nov. 13th:

Whereas the enlistment of men formerly engaged in agricultural production, and the wastage incidental to warfare have caused a serious reduction in the world's supply of food, and

Whereas the efforts of the Food Controller are rightfully directed to the conservation of wheat, beef and bacon which are so urgently needed to sustain our armies to victory, and

Whereas prominent livestock men were recently convened in Ottawa to organize a campaign for largely increased pork production in Canada in 1918, and

Whereas the latest Dominion census reveals the fact that on 41,482 farms in

Saskatchewan no pigs were raised in 1916, and.

Whereas the world situation promises a keen demand for all kinds of meat animals for years to come although the present crisis can most satisfactorily be met by the raising of pigs in large numbers,

Therefore be it resolved that this Assembly, which clearly recognizes the past achievements of Saskatchewan farmers in food production in spite of serious difficulties such as the scarcity and high cost of feed and the shortage of labour, which under existing conditions is likely to be even more acute in the future, does, nevertheless, urge upon our people the urgent and absolute necessity of their further participation in the war by the production of pork by every farmer to the limit of his ability, and

Be it further resolved that in order the better to encourage and insure the desired production of pork, the Food Controller do immediately take such action as shall effectively eliminate all unfair and unnecessary profits from the time the hogs leave the farmer's yard until the bacon reaches the consumer's table.

SALE OF WOOL

BELOW is given a statement of wool handled by the Co-operative organization branch of the Saskatchewan Department of Agriculture in 1917. There were

623 consignments, totalling 223,445 lb. of wool, marketed. The following table shows the grade of the wool and the prices realized for each grade:—

Grade	Lb.	Price Realized
Fine and fine medium staple.....	3,137	63c.
Fine and fine medium clothing.....	11,419	58c.
1½ blood staple..	14,887	67c.
¾ blood staple..	50,093	68c.
¼ blood staple..	63,256	68c.
Low quarter...	31,814	68c.
½ blood clothing.	20,802	63c.
Medium clothing	10	65c.
Black.....	1,483	55c.
Medium washed.	794	75c.
Tub washed	297	80c.
Murraine dead.	73	40c.
Dead.....	232	55c.
Damaged.	248	55c.
Seedy...	13,429	55c.
Tags ..	3,197	22c.
Mohair	127	40c.
Pelts...	46	30c.
Total	215,344	Average 65c.

Shipments received after August 1st sold locally, 8,100 lb. at 54c.

In a letter accompanying the foregoing statement, Mr. W. W. Thom-

son, Director, Co-operative organization, writes:—

I may explain that all of the wool that reached Regina before August 1st was forwarded to Philadelphia, where it was graded and sold. This wool brought an average price of 65c. per lb., while the 8,100 lb. which was received in Regina after August 1st was sold locally at a flat price of 54c. per lb.

ENCOURAGEMENT OF SHEEP BREEDING

All of the two thousand head of sheep purchased under The Live Stock Purchase and Sale Act have now been placed, and orders for more are on hand and coming in rapidly. A circular letter is being sent out to sheep owners, asking them to advise the Department of any sheep they may have for sale.

THE YEAR'S POTATO CROP

A SPECIAL effort has been made to ascertain as accurately as possible the quantity and condition of the potato crop in Saskatchewan this year. A list of questions was sent out by the Bureau of Statistics to its correspondents. An estimate was then made of the acreage and yield, which gives 67,000 acres under this crop, an increase of slightly more than 44 per cent over last year. The yield is estimated at 102.4 bushels to the acre, while the price at the present time ranges from 75 cents up to as high as \$2 per bushel in places where potatoes are scarce. On the whole the condition

was good and an average crop was the rule in most parts of the country. From the information secured a map has been prepared on which each municipality was coloured to show either a surplus, a shortage, or a sufficient quantity to meet local demands. Of the municipalities from which replies were received, 58 or 31.5 per cent show a shortage; 88 or 47.5 have a sufficiency; 39 or 21 per cent have a surplus. The shortage lies principally in the south-western part. Owing to an early frost some farmers were caught before they had an opportunity to dig their crops.

LIVE STOCK COMMISSIONER FALLEN IN ACTION

CAPT. J. C. Smith, Live Stock Commissioner for Saskatchewan, fell in action at the front on Nov. 10th. Capt. Smith is the fifth officer of the Saskatchewan Department of Agriculture who has lost his life in the war, the others

being Major A. F. Mantle, Deputy Minister; H. N. Thompson, Commissioner of the Weeds and Seeds Department; E. H. Hawthorne, Field Agent, Weeds and Seeds Branch; and H. Pawley.

PART III

Rural Science

SCHOOL GARDENS AND GREATER PRODUCTION

NOVA SCOTIA

BY L. A. DEWOLFE, DIRECTOR OF RURAL SCIENCE

SCHOOL gardens in Nova Scotia were given over very largely to vegetables this year. Potatoes and beans were the staple crops. Aside from "greater production", these crops have put the soil in better shape for future general gardening.

Early last spring we held small rural science teachers' institutes in several centres. In this way we reached about 500 teachers. The enthusiasm which usually results from an institute was carried back

to the schools. As a result, about 42 acres of land were this year cultivated by school children.

Owing to the change of teachers at mid-summer, we have been unable to get reports on the total amount produced or on its value.

Next year, we hope to have more travelling teachers in the field, who will not only follow up the work at planting time but who will be on hand in the fall to keep track of the harvesting and of the exhibitions.

NEW BRUNSWICK

BY R. P. STEEVES, B.A., DIRECTOR, ELEMENTARY AGRICULTURAL EDUCATION

SINCE the organization in 1913 of this Division of the Agricultural Department it has been our purpose to develop plans that could be put into operation in the elementary schools and which would have both educational and productive intent. Our fundamental object was at the first to increase the value of the school for the community that supported it, to direct the instruction given into channels related to local improvement. It was recognized that the movement of populations from the country to the town and city, was essentially

in a large degree influenced by educational conditions, by the quality and quantity of instruction given in the schools. The country was not keeping pace in production with the needs of the city's increasing army of consumers, the cost of food stuffs was advancing and the opportunities because of keen competition for "corners" were becoming greater. Morally, productively and commercially the situation was serious and the remedy seemed to us to lie in education.

The war has actually accentuated those conditions. It has in three

years produced a state of things that normally would have taken fifteen or twenty years to bring about.

OBJECT AND AIMS

Our plans seek to magnify the local or, better still, the consolidated school, to give instruction through industry, to bring industry into the school, to cause education to help in solving the problems of local improvement. Accordingly we in 1913 sought to equip the school for this task, in apparatus and in quality and matter of instruction.

We reasoned if in the school a vision of country life possibilities could be given to the children of the province the next generation might witness a change for the better. The school must change first; instruction in theory from practice must be inaugurated. If the district is to be helped through education the impelling power must gather force at the school. The school must, therefore, get into the eye of the people as a central figure in the community. What it teaches, the things it does, if it properly interprets environment, will find opportunity for execution in the homes. Instruction at school related to the community should as a result promote community improvement, both in increased production and better living and in consequence greater national prosperity.

We have held to our plans and have endeavoured logically to evolve them. Because of war conditions, however, we have sought this year to extend production far beyond the school garden and the natural expansion of home plot work. We have in addition in towns and villages had central plots cultivated by children. In some cases in districts where there are no school gardens, home and central plots have been undertaken under the supervision

of the teachers. These have been the result of patriotic appeals to enlist school effort in production for war purposes.

GOOD RESULTS OBTAINED

This year to all pupils reported to this division, whether in schools carrying on our special work or not, who have actually engaged in increased production work while still remaining at school, we have distributed buttons like the one illustrated.



The special supervisors who this year visited school and home plots during the vacation period promoted to a great degree increased production. So far as we have yet been able to judge this strengthening of our staff work has had excellent results. Official contact with the pupils at their homes, with the parents in the interests of the children has been very gratifying.

Statistics at the time of writing were not available that would enable us to give an approximate estimate, either of the total number of acres cultivated, or the amount of yield through school children's work this year. We feel sure, however, that many hundreds of tons of produce have been added to the supply through this means. The success of our school fairs demonstrates that a wide-spread interest has been given to this line of school appeal.

ONTARIO

BY J. B. DANDENO, Ph.D., INSPECTOR OF ELEMENTARY AGRICULTURAL EDUCATION

THE primary schools of Ontario in which classes in agriculture are conducted, carried out a fairly well organized plan for food production in 1917.

The effort was put forth in four directions: (1) To produce plants of food value only; (2) To exercise the area under crop; (3) To induce other schools to undertake to produce crops; (4) To raise chickens as home projects.

The methods employed to direct the teachers and pupils was to reach them by circular explaining the need and giving an outline of the method. Special circulars on school gardens and poultry projects were issued by the Department of Education to the inspectors and teachers concerned at the time most effective to produce results.

Instruction was given regarding these matters during the summer course for teachers at the O.A.C. during the previous summer and also on other occasions at teachers' conventions, trustees' associations, and in classes while visiting schools.

EXTENT OF THE WORK

The amount of food actually produced as a result of this effort is of course difficult to estimate, but some idea may be obtained from the following: About 950 schools in Ontario are teaching agriculture at the present time, and of these about 600 are conducting school gardens. These gardens vary from 6 or 8 square rods up to one acre. Where the plot is as large as one acre the crop is almost wholly potatoes. Where the plot contains 10 or 20 rods the crop is composed of common vegetables. One of these schools recently sold the crop for \$9.53 and gave the proceeds to the Red Cross. Another garden produced \$26.00. From the best information at my disposal I should

say that on an average, the amount of food produced would reach about \$7.50 per school, for the school gardens alone. This would make at least \$4500.

The schools that do not conduct school gardens are not considered in the above, nor are the home gardens of those pupils attending schools which have a school garden. It is more difficult to get data regarding the home gardens, but it very frequently happens that one pupil at home will grow as much as the whole school garden will produce. If we were, therefore, to consider the increase produced by the pupils in the home gardens we would easily reach the sum of \$40,000.

The school garden produce does not appear large because of the nature of the problem and of the amount of land involved. This problem is educational rather than economic.

GRATIFYING TOTALS

The poultry effort resulted in the raising of 22,000 chickens of an approved strain of a utility breed. This is the first year of this effort, consequently it is an addition entirely. If these are worth 50 cents each it would mean an increase of \$11,000.

To sum up, it may be safely said that through the efforts of the pupils directed by the teacher, the total increase of foods due to this effort is \$55,500.

The plans for 1918 are to be practically those of this year excepting that they are to be extended. The products from the school gardens can easily be quadrupled.

The home projects are also to be extended, and the amount estimated for 1918, might easily reach a total of \$100,000.

MANITOBA

BY R. FLETCHER, DEPUTY MINISTER OF EDUCATION

DURING 1917 the work of school gardens proceeded upon the lines of last year as a general rule. The only change reported is a tendency to conduct gardening operations as a school project rather than as a number of projects by individual pupils. This is mentioned by two of the inspectors, and another states that there is a noticeable interest in the idea of beautifying the school grounds.

The methods employed to inspire and direct the pupils depend chiefly upon the personality of the teacher. Several of the inspectors speak pointedly of the importance of securing the co-operation of trustees and adult members of boys' and girls' club schemes to give countenance and support to the school garden idea. The motive most frequently mentioned is the patriotic one of aid to war sufferers, Red Cross work, and increasing the food supply. The instinct of ownership is directly appealed to by allotting a separate plot to each individual. The principle of emulation, the competitive instinct, is appealed to in the care of separate plots by individuals. Two inspectors mention the efficacy of the appeal to the principle of ambition, the desire for power, as awakened and rewarded by prizes and monetary returns. One speaks of an interest in nature in general and growing things in particular as furnishing a motive which effectively inspires the school children: the sense of personal pride in the school grounds is spoken of in another report as a powerful spring of action; and still another emphasizes the value

of the school garden work as a "project" which the pupil takes a pleasure in planning and carrying out to a successful conclusion.

The addition to the food supply is a matter of pure conjecture, no statistics having been gathered in a systematic way. Some of the comments made upon this matter may be quoted:

1. "Between 50 and 75 bushels of potatoes were raised in the school gardens in this inspectorate."
2. "The season was unfavorable and the production small."
3. "The amount raised in school gardens was negligible, but that in club gardens considerable."
4. "One school realized \$25 from the sale of vegetables, canned produce and preserves."
5. "Twenty dollars' worth was raised by one school for the Returned Soldiers' Association."
6. "Not more than \$50 worth in this division."
7. "Fifty bushels of potatoes in the school gardens of this inspectorate, also some small quantities of lettuce, carrots, cabbage, corn, turnips and onions."

For the future it is generally expected that the school garden will continue to be an important feature of rural school effort. The boys' and girls' club movement, however, has developed a very great interest in the home garden. Many of the inspectors are of opinion that the school garden will in future tend to become an illustrative teaching agency, a sort of miniature experimental farm serving educational ends, both æsthetic and practical, while the home gardens will engage the spare hour of the pupils in their participation in club and fair projects and contests, all of which will be largely directed from the school.

SASKATCHEWAN

BY A. W. COCKS, B.SC., DIRECTOR OF SCHOOL AGRICULTURE

BY means of an article in the February number of *The Saskatchewan Rural Education Monthly* the attention of teachers and pupils in the province was directed to the production and thrift

Canada the boys and girls were preparing to assist in the production of food material by the growing of vegetables in their gardens and a quotation was made from a circular addressed to teachers and pupils of British Columbia asking them to create wealth by the cultivation of their school gardens. It was estimated that if every pupil in Saskatchewan would produce ten dollars' worth of vegetables it would add \$1,000,000 to the value of the wealth produced from the soil of the province.

Rural educational associations, agricultural societies and other organizations responsible for the management of school

campaign and to the Dominion Government's appeal to the farmers of Canada for increased production of food stuffs. It was pointed out that the boys and girls could assist in this work and it was suggested that during 1917 school gardens be devoted chiefly to the growing of vegetables. Reference was made to the fact that in 1916 the proceeds from the sale of school garden produce were given, in many cases, to various patriotic funds.

In the March number of the bulletin the subject again received attention, and special reference was made to the circular addressed by the Minister of Education for Ontario to the inspectors and teachers of that province, urging them to arrange to grow plants of food value in the school and home gardens. It was pointed out that in almost all the provinces of

fairs offered special prizes for garden competitions and for classes of vegetables to be exhibited at school fairs and thus

afforded another inducement to the boys and girls to join in this production campaign. The response to this appeal has been very satisfactory. At all of the school fairs, the number of which is approximately twice the



ENLISTED IN THE PRODUCTION CAMPAIGN,
WALLACE, SASK.



THE POTATO CROP, WALLACE, SASK.

number for 1916, the exhibits of vegetables indicated that a good deal of work had been done in the school and home garden by the boys and girls of the province. After the fair it was quite customary for the ex-

seed potatoes and will sell the seed of the best varieties to the people of the district.

The amount of extra food crop raised by the school pupils of Saskatchewan has been undoubtedly considerable, but owing to the fact that no special report on the school garden is made to the Department it is almost impossible to make any estimate of the actual amount of food material produced by the school pupils of the province.

With respect to work for 1918, there will be little modification of the plans adopted by the Department for 1917. Schools will be encouraged to devote their school gardens to the production of vegetables, and competitions in the raising of garden crops, pigs, calves, chickens, etc., will be organized by rural education associations, agricultural societies and home-makers' clubs.

In 1918 there will be over 200 school fairs during the fall and each of these will encourage the pupils of from ten to a dozen schools to raise foodstuffs, both in the vegetable and animal form.



MAIN ENTRANCE, SOUTH, NORTH REGINA SCHOOL, FIRST YEAR, AUGUST 15, 1916

hibits to be sold by auction and the proceeds devoted to the Red Cross Society. Several rural schools specialized in the cultivation of pure seed potatoes. In one case 45 bushels of potatoes were raised and sold and as a result the Red Cross Society benefited to the extent of about \$50. Another school has published its results from experiments with pure

NORTHERN SASKATCHEWAN

BY FRED W. BATES, M.S.C., DIRECTOR OF SCHOOL AGRICULTURE

THE campaign for greater production has without doubt resulted in a large increase in the amount of garden produce raised, but I know of no way in which this can be estimated, even approximately. The amount of this increase directly due to the school garden enterprise is still more difficult to determine. One thing is certain, the spirit of the time has helped in the campaign for popularizing the

school garden. Many people can see the value of production to whom the garden as an educational project would make little or no appeal.

Believing the school garden to be the laboratory for the nature study agriculture of the public school we have taken every opportunity both with the teachers and the general public to emphasize it as an essential feature of our school work. We have made no modification in this presen-

tation of the enterprise, and, further than presenting to the teachers through columns of the *Rural Educational Monthly* the general call for greater production, no pressure has been brought to urge greater garden effort. There has been a very definite reason for this attitude. Experience has shown that here in the West, where so many things are done in a large way, the inevitable tendency in the beginning of the garden work to attempt too much, results in much waste through weeds and careless handling of the whole scheme. It seemed unwise, therefore, to urge larger areas of work and so the emphasis has been laid on conservation, with the result I believe that much more has been produced and in addition habits of care and efficient management so much needed in our Canadian life have been developed. The usual method employed in the disposal of the garden

produce has been the auction sale, although in some cases regular customers have been secured. At the majority of the school fairs sales of the children's vegetables and other materials have been held, the proceeds being devoted to some patriotic fund.

The chief modification has come in connection with the home gardens and there has been a very great increase along these lines. The towns and cities have in several instances incorporated the home gardens and the vacant lot movement, and, without doubt, many have been led to begin garden work through the impetus of the home garden project.

For the coming year our motto for the school garden will be "Better gardens and total elimination of waste", for the home gardens, "Better and bigger gardens and conservation of the produce".

MANITOBA

BOYS' AND GIRLS' CLUBS

BY J. H. KITELEY, SUPERINTENDENT OF EDUCATION

PROBABLY no phase of Agricultural Extension work has developed so rapidly as the Boys' and Girls' Clubs, and it is now evident that expenditure of both money and energy in this work is accomplishing more gratifying results than if spent in other activities.

The membership in Manitoba is now 15,000. Four years ago it was 750.

The work is carried on in connection with the public schools, and its success is largely due to the unselfish support of the teachers of the province.

In organizing clubs the plan followed is to co-operate with teachers, public school inspectors and prominent business men and farmers. A central club is usually organized at

the natural marketing centres of the district. Its officers consist of an organizer, or general manager, president and secretary. The duty of the central club is to organize and direct the activities of the branch clubs established at each of the rural schools within a radius of from four to twelve miles. The president and secretary of both the central branch clubs are usually selected from the older members of the club.

While the school is the centre, the membership is not confined to the pupils. The older boys and girls of the district are eligible to membership, the age limit being from seven to eighteen.

This year the activities of the clubs are carried on along twelve lines or contests. The approximate

enrolment in the main contest is as follows:—

One-half acre of pure seed growing	900
Gardening and canning	5,000
Poultry raising...	2,500
Garment making	3,000
Cookery...	3,000
Pig, calf or colt raising.	2,000

Besides the above there is a large enrolment in manual training, noxious weeds contest, and the essay writing contest.

The Junior Seed Growers received sufficient wheat, oats, barley, corn or fall rye for a half acre plot. It was stipulated that the work be done

he or she select twenty pounds from their own supply. Improvement in form and quality and yield is aimed at. One pound of peas and one pound of beans were also distributed free to each member in the gardening contest. Altogether 725 bushels of potatoes and 10,325 pounds of peas and beans were distributed. This year we are emphasizing the gardening and canning work of the club. Late spring frost and an exceedingly dry summer have had a disastrous effect on many of our gardens. However, our members are getting some splendid results even under these



BOYS AND CALVES IN THE CALF FEEDING CONTEST AT PORTAGE LA PRAIRIE BOYS' AND GIRLS' CLUB FAIR

entirely by the boy. These plots were inspected by competent men and the boy instructed in the principles of selection. From this half-acre plot the boy or girl selects sufficient heads of the most desirable type for his quarter-acre plot next year.

Besides the prizes given at the local Boys' and Girls' Club Fair, \$150 in prizes will be awarded at the Provincial Seed Fair next fall. The exhibit consists of a half bushel of grain and a sheaf.

HOW THE COMPETITIONS ARE OPERATED

In the gardening contest potatoes, peas and beans are the main crop. Ten pounds of potatoes were supplied free to the members on condition that

adverse conditions by extra cultivation. Canning demonstrations were given at most of the centres. Practically all of the surplus vegetables are being canned.

A local bank has given able support to the movement, and it is largely due to this interest that so many pigs were in evidence at many of the fairs. The managers frequently lend money to the boys and girls to buy pigs, taking as collateral only the boys' or girls' own note. Last year every note was promptly redeemed on maturity. The boy or girl purchases a pair of young pigs in the spring, has their weights certified by an officer of the club, and then feeds them through the summer, keeping an accurate record of the kinds and amount of feed used. On

the day of the fair the pigs are again weighed, and their records handed to the director of the contest as a guide to the judge in making the awards. The pigs are often sold on the day of the fair, and they readily

established clubs select settings from individuals of their own flock which are of the most desirable type. Anywhere from fifteen to seventy-five exhibit coops of poultry may be seen at the local fairs.



SEVEN PENS OF WHITE WYANDOTTES SHOWN AT PORTAGE LA PRAIRIE BOYS' AND GIRLS' CLUB FAIR. FORTY PENS WERE SHOWN

command the highest market price. The profit is the boy's. It is no longer "Johnny's pig and Daddie's pork."

Poultry raising is a valuable contest, and is resulting in much im-

SHORT COURSES IN MANUAL TRAINING

In connection with the manual training work twenty short courses were held during the summer, each



COOKING AND CANNING, PORTAGE LA PRAIRIE BOYS' AND GIRLS' CLUB FAIR

provement among the poultry flocks throughout the province, as well as furnishing valuable training to the members. Pure-bred eggs are supplied to new clubs. Members of

of two weeks' duration. These were conducted by the regular manual training teachers of the province. Such lumber as could be obtained locally (even packing boxes were

sometimes commandeered) and improvised benches were used. The only tools used were those that they could obtain at home. Each boy and girl made from three to six useful articles which would have done credit to a boy working in a fully equipped manual training room.

Nor is the girls' work forgotten. Twenty short courses extending over two weeks each were conducted in cookery and sewing this summer. The exhibits in cooking and sewing at the fairs call forth many an exclamation of surprise both for their number and excellence.

A notable feature of the fairs is the number of prizes won by the girls for poultry, calf and pig raising.

The noxious weed contest is one of the most instructive in the list. A collection of mounted weeds accompanied by a collection of weed seeds in small bottles, neatly mounted, require both knowledge and skill if satisfactory results are to be obtained. A very large exhibit of noxious weeds is anticipated this fall, according to reports from the clubs.

BULLETINS CIRCULATED

The following valuable bulletins were prepared and published this spring for the use of club members in their respective contests:—

Seed Growing—Professor T. J. Harrison.

Pig Raising—Professor F. Jacobs.

The Home Garden—W. T. G. Weiner, B.S.A., and J. A. Neilson, B.S.A.

Garment Making—Miss Blackburn.

Canning by the Cold Pack Method—Prof. C. H. Lee and Miss R. M. Atkinson.

About 160 fairs were held between September 1st and October 15th. The Extension Service of the Agricultural College furnished judges for these fairs. Prize cards, judges, books, ribbons, pins, entry tags and envelopes, are also supplied by the Extension Service. Although the fairs are held during a very busy season in Manitoba, the attendance compares favourably with that of the Agricultural Society Fairs.

Beside the local prizes, many well-worth winning special prizes are offered.

In an article in the *Farmer's Advocate* of November 8th on "The Canadian Boy as a War Helper," Mr. Frank Yeigh, well-known as an author, after quoting examples of the work done on the farm by the veriest lads last summer, writes: "So the interesting human documents run, revealing the mind and purpose of these sons of the Dominion who will make or mar the Canada to be. Reference has been made to the Soldiers of the Soil. It is the alliterative title of a movement of co-operation by the Y.M.C.A., the various Sunday School associations and five of the Protestant denominations, to encourage the boyhood of Canada to assist in farm production, and already responses have come from every province. The S.O.S. initials stand for the wireless call, and the S.O.S. directors have been appointed in local churches and communities to further act co-operatively. In Guelph these agencies worked so effectually that two hundred boys and girls engaged in work on gardens, vacant lots and farms, with crop results in the city alone estimated at a value of \$25,000."

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

VACANT LOT GARDENING

A CONSIDERATION OF METHOD AND ACCOMPLISHMENT IN THE CITIES OF THE DOMINION

WHILE the utilization of vacant lots and back-yards for vegetation has received a great impetus this year, the work was only an innovation in the sense that organization was more general and communal interest and activity enlisted in greater measure than previously. To ascertain to what extent these features were brought into existence and to be in a position of helpfulness in suggestion from one community to another, requests for information on the points involved were sent to the secretaries or other officials of the different organizations concerned in cities with a population of 10,000 and over. To publish verbatim all the replies received, often with reports, illustrative and descriptive

literature and other matter, would take a volume of some dimensions. An attempt has, therefore, been made in the following to bring together the main particulars in such a way that if there is any apparent improvement in one or more directions in the methods adopted, either in origin or management, of one centre compared with another, all may have the benefit, thus creating a real communal of interest. In this connection first consideration must naturally be given to details common to all, such as the number of members and the scope of the activities. For this purpose the table that follows has been prepared from the replies that have been received:

PLACE	Organization	No. of Members	No. of Gardens	Total Area	QUANTITY OF CROPS	
					Potatoes	Other Crops
Brandon, Man.	Vacant Lot Association	325	300	25 acres	1,875 bus.	All light
Brantford, Ont.	Thrift League	300	300 new land gardens; 250 revised gardens	40 acres	not estimated	Not known
Calgary, Alta.	Vacant Lots Club	1,113	1,113	220 acres	15,500 bus.	Varied
Edmonton, Alta.	Vacant Lots Garden Club	261	685	100 acres		Varied
Galt, Ont.	Vacant Land Production Association	165	200	45 acres	2,500 to 3,000 bags	Varied
Glace Bay, N.S.	High School Boys			Golf Links	6,000 bus.	
Greenfield Park, Que.	Horticultural Society	234	182	75 acres	600 bags	Varied
Guelph, Ont.	No one organization	2,000	1,500 to 1,800	.	50% of city crops	Varied
Hamilton, Ont.	City Garden Club	250	255	55 acres	2,400 bus.	Varied
Hull, Que.	Individual		Many	30' x 33' each	No record	Varied
London, Ont.	McClary Welfare		100	14 acres	500 bags	Varied
London, Ont.	St. Ry. Potato Synd.	59	1	9 acres	600 bags	
Moncton, N.B.	Public-spirited men and City Council			27 acres		

PLACE	Organization	No. of Members	No. of Gardens	Total Area	QUANTITY OF CROPS	
					Pctatoes	Other Crop
North Bay, Ont.	Agricultural Committee of Council		125	12 acres	1,000 bags	
Owen Sound, Ont.	Gardeners' Association	200	200	125 acres	6,500 bags	Varied
Ottawa, Ont.	Vacant Lot Association	260	1,160 and 22 worked en bloc	100 acres	Upwards of 12,000 bus.	Varied, about 10,000 bus.
Ottawa, Ont.	St. Andrews' Church Free Gardens	122	122	15 acres		..
Port Arthur, Ont.	Garden Club	525	525 at least	No sure information		Varied
Regina, Sask.	Vacant Lot Garden Association	225	415	30 acres	No definite statistics	Varied
Sault Ste. Marie, Ont.	Patriotic Production Committee			26 acres	Average	Average
Saskatoon, Sask.	Vacant Lot Garden Scheme, Public Health Dept. & Parks Board	600	600	83 acres	8,400 bus.	Varied
St. Thomas, Ont.	Home Gardening Association	100 on large areas	100 on large areas	Large areas, 15 acres Small areas, no record	No record	Varied
St. Lambert, Que.	Horticultural Society	About 150	About 150	140 acres	No record	
Sherbrooke, Que.	Civic Improvement Committee, Board of Trade	350	300	Lots 50 x 100	No record	No record
Stratford, Ont.	Vacant Lot Committee		151			
Toronto, Ont.	Vacant Lots Cultivation Association in Co-operation with the Rotary Club	20 executive members	826	150 acres	1 bag to a lot	Varied
Victoria B.C.	Increased Production Com.		333	120 acres	No record	Varied
Westmount, Que.	City of Westmount	300	300	750,000 sq ft	No record	No record
Windsor, Ont.	Resources Committee	Indefinite	700	80 acres	No record	Varied
Winnipeg, Man.	Weston Agricultural Society	119	79 home, 150 vacant lots	9 acres	1,150 bus.	Varied

ORGANIZATION

The foregoing table shows that the organizations having the work in hand were of a varied character. In some places there appears to have been no set organization whatever, the work being undertaken by public-spirited citizens individually. In others existing organizations such as horticultural and agricultural societies and rotary clubs bent their energies to the task. In others again, the city councils and boards of trade bestirred themselves, and in others, yet again, the local branches of the National Service and of the provincial Resources Committee systems shouldered the responsibility. In the West especially, the vacant lot associations and garden clubs, most of which have been running for several years, made special efforts towards extension of areas and increased production. Guelph, it will be seen, leads in both membership and number of gardens, and Calgary in number of acres covered, while

Ottawa, the figures from which city are more definite than in any other case, and Calgary seemingly run each other closely in point of total production. At Guelph, as becomes the city in which stands the Ontario Agricultural College, every local association appears to have made common cause, but, besides Ottawa, Brantford, Port Arthur, Galt, Owen Sound and Windsor stand out prominently in Ontario in proportion to their population. The Ottawa Vacant Lots Association, in conjunction with the free garden system of St. Andrew's church, comes second in number of gardens, and Montreal, taking Westmount and St. Lambert together, second in acres covered. Toronto comes third with 150 acres and Owen Sound fourth with 125 acres. It will be understood that methods of computation, both of space and quantity, probably varied just as the methods of organization appear to have done. The replies received, although the same par-

ticulars were asked of all, also differed greatly. One is herewith quoted because of the spirit it manifests and because it proves that if the West is much to the fore the almost extreme East is not unmindful of its duty. The reply, as will be observed, is from Glace Bay, Cape Breton, and runs as follows:

Although the information here given from the Maritime Provinces is not much in detail, good work was done there, as is proven by the fact that at Halifax, N.S., 270 loads of manure were delivered and 100 lots ploughed. The school children were also supplied with 5,250 packages of flower and vegetable seed.



OTTAWA VACANT LOT GARDENS—A GENEROUS RESPONSE FROM MOTHER EARTH

Glace Bay, Cape Breton,

The centre of the great eastern coal fields, where the sun comes up on Canada.

Has 17,000 population;

2,400 boys at the front;

215 killed;

6 military crosses;

7 military medals;

4 distinguished conduct medals;

10 promotions from the ranks on the field of honour.

Professor McKinnon with a bunch of high school boys and the financial backing of the Dominion Coal Co., raised 6000 bushels of potatoes on the old golf links.

There was a school exhibition of back-yard garden truck at which we had over 2000 entries and had potatoes from 3 lb. 11 ounces down to $\frac{1}{2}$ lb., cabbages 17 lb., pumpkins 37lb., and everything else big. The Kids made a marvellous show and are enthusiastic to go bigger next season. National Service has been a success.

(Sgd) STUART MCCAWLEY,

Hon. Sec. Kitchener Club, Glace Bay.

THE METHODS EMPLOYED

Following are a few excerpts from the statements received which further explain the methods followed in organization:—

Guelph.—Many community agencies united as Soldiers' Sons and Sisters of the Soil and S. O. S. The S. O. S. is formed of boys and girls of the Y. M. C. A. and Sunday Schools.

Brantford.—The garden section of the Thrift League divided the city into sections with a chairman for each section. These chairmen organized small committees, the members of which made a personal call on every resident of the district. Where a man had land at his residence that was not being worked he was urged to make use of it. If he had not land of his own, he was asked to work a lot supplied by the Thrift League.

Galt.—After a gathering of citizens had

decided to form the Vacant Land Production Association, a series of public meetings were arranged at which the speakers were men who understood gardening in its different phases, such as ploughing, hoeing, planting, seeding and weeding and cultivation.

Stratford.—Representatives from the city council, the park board, Horticultural Society, Daughters of the Empire and public school board met and organized a Vacant Lot Cultivation Committee.

Sherbrooke.—The road department of the city offered free ploughing and harrowing. The Board of Trade Committee urged the citizens to take hold.

St. Lambert.—The town council asked the local horticultural society to undertake

Hamilton.—The City Garden Club was the outcome of the co-operation of the city with the Hamilton Horticultural Society.

St. Catharines.—The Food Production Association is formed of members of the horticultural society, board of trade and city council.

London.—The work was conducted by a committee of the McClary Welfare Association, the Street Railway Company and other agencies.

Windsor.—A committee having been formed by personal effort the city undertook to pay all bills for ploughing and advertising. The city also loaned ten teams.

Owen Sound.—Committees from the city council, boards of trade, workingmen's clubs,



OTTAWA VACANT LOT GARDEN—"THE WOMAN WITH THE HOE"

the work and the council would arrange for the ploughing and harrowing.

Ottawa.—Upon the initiative of the Ottawa Horticultural Society a meeting was held of representative members from the Canadian Club, the Board of Trade, Rotary Club, Trades and Labour Council, Soldiers' Wives League, National Council of Women and other organizations and the Vacant Lot Association formed. On the recommendation of the Glebe Trustees, the congregation of St. Andrew's Presbyterian church, Ottawa, granted permission to use the vacant property owned by the church for free garden plots and a committee was appointed to take the necessary steps to have the land ploughed, harrowed, disced and surveyed into plots.

boards of education and horticultural society got together and formed a Gardeners' Association.

St. Thomas.—The executive is composed of representatives from the city council, board of education, board of trade and horticultural society.

North Bay.—The city council appointed a committee who enlisted the co-operation of a number of citizens.

Port Arthur.—The markets committee of the city council took the initiative. The chairman of the committee accepted the chairmanship of the Garden Club at a public meeting and the superintendent of parks was elected vice-president and the city clerk, secretary.

Winnipeg.—Operated under the Manitoba Agricultural Societies Act.

Regina.—The Vacant Lot Garden Association is composed of a committee of business and professional men with a chairman and secretary-treasurer.

Saskatoon.—Persons desiring to secure a vacant lot for gardening purposes made application at the Public Health Office. The applications were granted in order as they were received.

Calgary.—The executive committee of the Vacant Lots Club meets monthly. It is composed of twelve members selected by the cultivators and twelve selected by the city council, the board of trade, the consumers' league, the trade and labour coun-

SECURING LOTS

The method of securing lots was in many cases similar. The names were procured from the assessors of vacant lots and the owners were approached by circular and in some instances by personal canvass. In one or two cases, as soon as the object in view became apparent, there was a spontaneous offer from owners of lots. Advertising in the newspapers was also resorted to. The churches were approached and the clergy requested to make announcements of



OTTAWA VACANT LOT GARDEN—BEETS, BEANS AND OTHER FOOD CROPS

cil, the horticultural society, the associate charities and other organizations.

Edmonton.—Various city organizations elected representatives which constituted the board of directors who met and elected an executive committee. The committee appointed a superintendent who gave up his whole time for four months of the year.

Victoria.—A committee of citizens listed lots available for cultivation and allotted them. They ploughed, harrowed and disced the land and bought and sold seed potatoes at cost, 14½ tons being thus disposed of. Many vacant lot back gardens were cultivated, besides those under the control of the committee. The expenditures and receipts balanced at about \$2,200 for the season.

what was going forward from the pulpit. In Ottawa preliminary work was done by a sub-committee of the Horticultural Society, the result being the permission to use large areas. When the work was turned over to the Vacant Lots Association, personal requests to real estate owners were made and a notice given in the press requesting offers of land. The responses were taken into consideration by a special committee who reported on their adaptability. As regards the St. Andrew's Church

system, advertisements in the city papers were inserted and notices from the pulpits requested, announcing that applications would be received for the plots and that the committee would be on the grounds at certain times to make the allotment.

At Stratford, a circular was issued with a coupon to be filled in by those who had available lots and another coupon to be filled in by anyone desiring to cultivate a lot. In the majority of cases the telephone and postal facilities were freely used. Building and land companies gener-

PLOUGHING AND FERTILIZING

Little fertilizing was done, operations being commenced in many cases too late to permit of this being thought of. In instances the ground had been used for gardens previously and had laid fallow for years. Especially was this the case where real estate agencies had acquired land on the outskirts of cities and towns. Ploughing was frequently undertaken by the city. Where this was not done, a small fee was charged proportionally to the cultivators of the lots. At Halifax, eighty cents per hour was charged for work and from eighty cents to one dollar per load for manure. Special advantages were offered in all the principal cities to returned soldiers and the wives of soldiers. For these in every case ploughing and discing and any other preliminary work with instructions were freely forthcoming. At Westmount, a fair sample of the policy pursued was furnished. The ploughing was done by co-operative labour and charged to the cultivators of lots, except in the case of returned soldiers and soldiers' wives, municipal employees and the Boy Scouts who cultivated for the soldiers and patriotic purposes.

At Ottawa the lots were ploughed by ploughmen hired by the day under direct supervision of a superintendent. Only where the land was very poor was any fertilizer applied, which was obtained from the corporation incinerators, the association paying for the teaming of the manure. A small quantity was also donated by some private citizens. After being ploughed the ground was gone over twice with a disc harrow before being turned over to the plot-holders. The St. Andrew's Church committee made a contract with a farmer to plough, disc and harrow the land, but no fertilizer was used. At Toronto, where the city council made a grant of \$2500, farmers and teams were hired for ploughing and paid from \$6 to



A SOLDIER'S WIFE, WHO CULTIVATED A VACANT LOT IN TORONTO AND PRODUCED \$70 WORTH OF VEGETABLES

ally surrendered their land for the time being. The corporations of different cities also volunteered the use of the land at their disposal. In instances, a small fee was charged of one dollar per lot. This was the case notably in Toronto and Winnipeg. In Calgary a fee of one dollar was charged for the first lot and fifty cents for the second lot, a lot being 3000 square feet.

\$7.50 per day, the total expenditure for this service being \$1,021. Manure was donated by private parties and corporations and \$1 a load was paid for hauling. Guelph is another city that made a grant of money for the purposes of ploughing, but the lot-holders had to do their own fertilizing. At Brantford a fee of \$1 for one-tenth of an acre was charged for ploughing, the city supplying the teams and harrows. Plot-holders had to do their own fertilizing if it was necessary. At St. Catharines the

fertilizer was used, and the cultivators paid for their own ploughing, except in the case of fifteen acres of park property which was ploughed by the city and lot takers assessed in proportion. At Sault Ste. Marie, ploughmen were engaged at \$6 per day, and averaged three-quarters of an acre per day. The actual cost was proportioned among the cultivators. At Port Arthur, the City Council ploughed and harrowed, and charged one dollar for a thirty-three foot lot.



TORONTO VACANT LOT—CULTIVATED BY A ONE-ARMED MAN

committee dug and ploughed the yards of soldiers' wives free of charge and advertised that they would plough eighth of an acre lots on the same terms. Forty people responded.

At Galt, the co-operative system was used for ploughing, and the cost of ploughing and harrowing averaged \$1.50 per lot. Fertilizing was considered necessary in very few cases. The garden charges for work were identical in many cases. At Windsor the teams employed were from the city and cost lot-holders only seventy cents an hour. At Owen Sound, no

At Winnipeg, where the lots were 33 by 100 ft., the city did the ploughing, the cost to the cultivator being covered by the \$1 fee charged in all cases. Manure was supplied free by citizens, the gardeners doing their own fertilizing. At Saskatoon, one dollar was charged for ploughing, discing and harrowing lots with a frontage of twenty-five feet, the work being done by the Parks Board. At Victoria, B.C., the city ploughed the lots and sold manure at sixty cents a cartload. The statement received says, "We are plough-

ing and selling manure this fall in preparation for next season. We did not break even at \$2.25 per lot this year, for ploughing, discing and harrowing, the cost being about 2.80. Next year we shall charge \$1.75 for ploughing, 75c for discing, and 50c for harrowing.

PLAN OF ALLOTMENT

Except as regards the sizes of lots, which differed considerably, the plan of allotment was very similar all over. Applications were registered and accorded choice of lots in the order

preference, the lots being free, while others paid \$1 for the year's privilege.

The sizes of lots depended to a large extent upon the number of applicants and the area of land available. At Sherbrooke, Que., the lots were 50 by 200 ft. each, at Ottawa 25 by 100 ft., and St. Catherines one-eighth of an acre. At Owen Sound the city's 15 acres were apportioned into lots of 6000 square feet each. At Regina, Sask., the land was divided into lots 25 by 125 ft., and \$2 charged per lot, which covered the ploughing. An office is



FIRST PRIZE COLLECTION OF VEGETABLES, GROWN ON VACANT LOTS AT TORONTO BY C. HONEYMAN, WHO ALSO WON 11 FIRSTS, 5 SECONDS, 2 THIRDS AND 1 FOURTH

received. At Westmount, Quebec, large sections were granted to municipal employees, members of the Khaki League and Boy Scouts, and small sections to individual cultivators. Efforts were generally made to give applicants lots near their own home, and where groups were formed, as in Ottawa, the lots were allocated as nearly as possible together. Plots were sometimes numbered and distinguished by sign boards. At London, Ont., the lots were numbered, the numbers placed in a box and drawn for by the applicants. At Toronto and elsewhere, soldiers and soldiers' dependents were given the

opened in the spring for registration and reception of fees. In Saskatoon applicants were required to sign a promise to cultivate.

The Secretary of the Resources Committee at Windsor, after advertising that lots would be ploughed, discing and harrowed for people undertaking to cultivate them, distributed circulars with Government advertisements on one side directing attention to the seriousness of the situation, and, on the other side, giving diagrams of gardens and advice on what to plant and details of food values. These circulars were sent to the school teachers, who had them neatly folded

and put into every house in the city, pupils taking different streets.

THE SECURING OF SEED

Halifax, Sherbrooke, Toronto, Brantford, Galt, Windsor, Owen Sound, Edmonton and Victoria made arrangements with local merchants to sell seed at cost to cultivators under the scheme. St Lambert, Westmount, Hull, St Catherines, Stratford, Greenfield Park, Winnipeg, Brandon, Regina and Saskatoon allowed lot-owners to purchase seed at their own

tomato and celery plants free, acting under the advice of the District Representative. At Port Arthur the city bought 243 bags of potatoes and sold at cost. At Ottawa the matter of seed was largely left to the plot-holders with the exception of potatoes, of which the association secured 200 bags at wholesale prices and sold at the same figure to plot-holders, one bag to each man. At Owen Sound the association secured 200 bags of potatoes and the city 400 bags and sold them at cost.



GALT LOT GARDENERS IN POTATO PLOTS

option. At Hamilton the city bought seed potatoes and sold them at cost and the Horticultural Society gave seeds as premiums. At Guelph, the Y.M.C.A. Production Club provided seed potatoes at cost. At London, the Welfare Association bought a carload of potatoes and sold them at cost. They also purchased Paris green and small hand sprayers. At St. Thomas the Board of Trade bought a carload of potatoes and sold them at cost. At North Bay the Committee did the same thing. At Sault Ste. Marie the committee guaranteed seed potatoes at \$3 a bag, and supplied cabbage, cauliflower,

CULTIVATION, SPRAYING, ETC.

In the majority of cases the land having been once allotted, to the holders were entrusted the entire operations. In one or two cases, provision was made that if the lots were not properly cultivated, they would have to be surrendered. At Ottawa, in the few cases where a group of lot-holders wished to work jointly, the association did some extra cultivation at apportioned expense. Several had manure put on the plots, but the majority used the land as it was. Practically all land loaned to the association was sod.

Except in cases where couch grass was very bad, the work done by this association, followed by faithful work on the part of the plot holders, secured very excellent results. The spraying was also done by the plot-holders, and only on a very few scattered plots was there any damage to the crop from insects. In Toronto, the Executive of the Vacant Lot Association ploughed the manure in where required and provided sprayers, and lot-holders did their own spraying. All the cultivation had to be done to the satisfaction of the superintendent. As at Ottawa, so at Stratford, the Committee used the local papers for articles on cultivation. At Guelph, lots were to be confiscated if not looked after or seeded by date in agreement. Only two lots out of 1600 had to be given up.

AWARDS AND PRIZES

Despite the fact that one correspondent, replying to a question as to whether special encouragement by means of awards and prizes was given says, "Don't believe in it; results ought to be our reward," at by far the larger majority of places heard from such encouragement was held out. In some instances special exhibitions were held at which the awards were made. In other cases the products were judged and decisions rendered at the regular annual exhibitions of the horticultural and agricultural societies, or at the district fall and school fairs. Samples of what was done in this direction are herewith given:—

Greenfield Park, Que.—Special prizes for best gardens, flower and vegetable, separate and combined; special prizes for first-year gardens; exhibits made at annual exhibition and children's competitions held.

St. Lambert.—Three prizes given by the horticultural society.

Westmount.—Prizes for best gardens and best produce at annual exhibition.

Ottawa.—By the desire of subscribers to the funds the management committee set apart \$300 to be distributed in prizes. Three groups were formed, western, cen-

tral and eastern. These groups were divided into two classes, one for plots growing a general crop and one in which two-thirds or more of the plot were in potatoes. Six prizes were given and six certificates awarded in each class. In the potato class the prizes ran from \$10 to \$1 and, in the general class, from \$15 to \$1.

St. Andrew's Church, Ottawa.—The plots were judged three times by an expert from the Experimental Farm and certificates of merit awarded.

Toronto.—Prizes were awarded at the Canadian National, horticultural society and other exhibitions, special and otherwise.

Hamilton.—One hundred and thirty dollars was distributed, principally by the horticultural society.



A SOLDIER'S GARDEN AT GALT, ONT.

St. Catharines.—Colonel Leonard gave prizes for the best kept garden and best potato plot.

Guelph.—To boys and girls, buttons were distributed according to the value of the crop, one girl raising \$70 worth; two hundred secured these buttons. Certificates and ribbons were given to members of the Home Garden Club and other societies; 60% of the cultivators securing these awards.

Brantford.—Prizes were awarded by city sub-divisions.

Galt.—Thirty-three prizes and a special prize of a silver medal were awarded, first, second and third being given in each ward, and first, second and third for ladies who undertook to work a vacant lot. Other prizes were given for lots situated on unpromising land. The prizes were presented at the horticultural show and at the fall fair, where tables were set aside for the use of vacant lot holders. A returned soldier and a gentleman over eighty years of age each secured a number of prizes. Photographs were taken of all the prize winners.

Stratford.—Prizes open to all amateur gardeners in the city of \$20, \$15 and \$10 and three of \$5 each were awarded at the

vegetable show held at the end of the season. The prizes were donated by citizens.

London.—Three prizes for best kept lots, first \$3, second \$2, and third \$1. A vegetable show was held at which three prizes for the best peck of potatoes were given, viz., \$3, \$2 and \$1, and three prizes for the best collection of vegetables, also of \$3, \$2 and \$1.

Windsor.—The Board of Education furnished prizes for children. A \$5 prize was donated for each of the four wards by members of the resources committee.

Owen Sound.—Six prizes were given for gardens and the park property. First and second for the best plot of potatoes, first and second for the best plot of white beans and first and second for general culture.

North Bay.—Prizes awarded according to score kept in three times judging during the season. Prizes were also awarded at the

Victoria.—Prizes amounting to \$275 for the best kept gardens and \$80 at fall fair for vegetable exhibits.

THE CROPS RAISED

In many cases no returns of quantities of crops raised were made and no records kept. Where anything definite was stated the information thus conveyed will be found in the table given in the forepart of this article. Further details that have been furnished by the correspondents will be found interesting and encouraging. At Greenfield Park, Que., the 600 bags of potatoes raised were mostly Green Mountain, while the other crops produced were: 2500



AN EXHIBIT OF VACANT LOT PRODUCE AT LONDON, ONTARIO.

fall exhibition in two sections, juvenile and adult.

Port Arthur.—The city council gave prizes for the best cultivated gardens of \$20, \$15 and \$10 and six others of \$5 each. Additional prizes were given to soldiers' wives of \$12, \$8 and \$5.

Winnipeg.—Garden competitions: Home —(1) lawns, (2) flower gardens, (3) vegetable gardens, (4) best all round gardens, (5) flower gardens, (6) vegetable gardens, (7) best all round gardens; 2-3-4 on lots of from 25 to 33 feet frontage; 5-6-7 lots over 33 feet. Vacant lot competition for gardens on land broken spring 1917, three prizes in all but 4 and 7. Special prizes were given for the patch kept free of bugs.

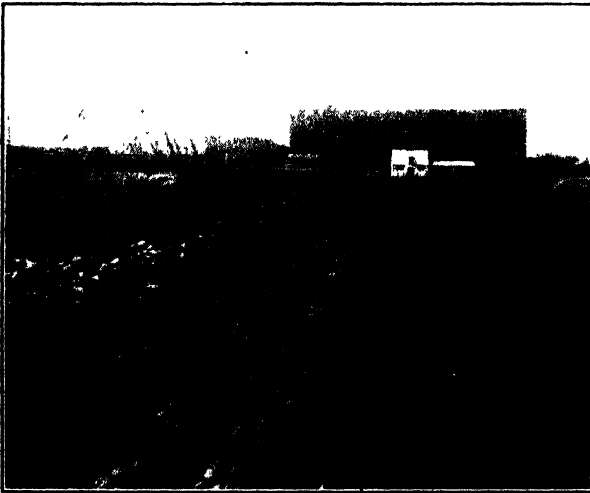
Calgary.—Prizes amounting to \$200 for the best gardens or cultivated land and for the best products, divided into 13 classes.

Edmonton.—Prizes given by the horticultural society.

head cabbage, 400 bags onions, 125 bushels green peas, 300 bushels beans (various), 300 bushels tomatoes, 285 bushels turnips (various), 150 bushels parsnips, 500 lb. strawberries, 75 gals. blackberries, 50 gals. red berries and an average crop of other vegetables and fruits, parsley and sage, etc. At Ottawa the 10,000 bushels of crops raised, in addition to the 12,000 bushels of potatoes, consisted of beans, beets, cabbage, carrots, corn, lettuce, onions, parsnips, peas, pumpkins, radish, squash, tomatoes and turnips. At Toronto the averages to a lot ran: potatoes, 4 bags; onions, carrots and parsnips each 3 bushels; beets, 4 bushels; swedes, 5

bushels; beans, 2 bushels; peas, 1½ bushels; cabbage, 30 heads. Lettuce, chard, celery, cauliflower, Brussels sprouts and other garden stuff were also raised.

While reports from the West are to the effect that the dry season had a modifying effect on the vegetable crops, places so far apart as St. Catharines, Ont., and Sherbrooke, Que., report potatoes to have been a partial failure owing to the wet



A MCCLARY WELFARE GARDEN AT LONDON, ONT.

weather. At the same time it is worthy of note that St. Catharines reports an absence of interest in the vacant lot cultivation campaign owing to the general prosperity. The statement received from Guelph says that the operating societies raised 50 per cent of the city's potatoes, and almost every other crop was of good quality. An estimate of values reads: 3200 houses, at least 1500 gardens, producing average \$10. total \$15,000; 100 acres in vacant lot cultivation, very conservative estimate \$100 per acre, \$10,000. While giving no definite particulars St. Thomas and other places report excellent results.

MARKETING AND STORING

In few instances were any arrangements made for marketing surplus crops. In fact there appears to have been little left over when the growers had reaped and garnered what they needed for their own consumption. Guelph, however, operated an amateur garden market. Literature was circulated and instructions given on canning, and if there were any surpluses left over,

it remained with the individual to dispose of them. At Saskatoon the City Parks Board erected a root house and invited parties requiring space to make application, a charge of 3c a bushel being made to pay for a man's services during the winter. By the end of October 4000 to 6000 bushels of potatoes had been stored. At Calgary, the Vacant Lots Club possesses a storage warehouse with a capacity of 50,000 tons. At Ottawa, the Women's Canadian Club undertook to dispose of any surplus and succeeded in realizing a considerable sum which was

devoted to patriotic purposes. At Toronto, it was calculated that the produce of each of the 800 lots was worth \$43 and that the cost of production was \$5.25. In some instances lot-holders are said to have sold their produce for \$100.

METHODS OF PUBLICITY

There is one point on which all the responses to the questions asked agree, namely, in the generosity of the press in gratuitously printing notices, publishing special articles on gardening and vegetable cultivation and giving editorial encouragement. This aid to the movement was unanimous in all the cities and towns. Circulars and pamphlets were very generally distributed, and

the co-operation of the churches was most freely extended. Sherbrooke, Que., adopted the rather novel method of sending out leaflets along with the electric light and water bills. In Ottawa a standard application blank was carried by the daily newspapers for a couple of weeks, assisting materially in attracting applicants. A circular letter widely distributed, stating the object sought and soliciting funds, was almost resultless. Placards in

street-cars and in the principal stores proved good advertising. The Thrift League of Brantford paid for some advertising from funds derived by the conservation of waste, in the sale of paper, rags, etc. The schools were used to a general extent for the distribution of encouraging and instructive literature. Public meetings and lectures were invariably resorted to. At Port Arthur the Park Superintendent prepared a blueprint plan showing a model garden.

strators were present, one doing the actual work of preparing the ground and sowing the seeds, the other giving a short talk and answering questions. There is no doubt that the beginners secured much valuable aid in this way, as well as from the superintendent who gave as much of his time as possible to instructing. In the Glebe vacant lots a few locations were let to expert gardeners, who in return gave assistance to beginners. Mr.



A VACANT LOT GARDEN AT THE "FOREST CITY"

INSTRUCTION TO BEGINNERS

Where possible the services of experts from Government farms were used to give advice and counsel to beginners. Lectures were frequently held and demonstrations made. The Superintendent of Parks in each city was also called upon to render his services. In every case all of these services were free. In the case of the boys and girls, school teacher were called upon to interest the pupils as much as possible in garden cultivation. A fair example of what was done in the majority of cases is afforded by Ottawa. Early in the season demonstrations were held on three successive afternoons in three different parts of the city. These were well attended and two demon-

W. T. Macoun, Dominion Horticulturist, rendered valuable service with expert advice. Government literature, both federal and provincial, was also very generally relied upon. The newspapers rendered admirable service by publishing articles on different appropriate subjects. At Brantford, for instance, each daily paper ran a page every week devoted to beginners' questions. At Winnipeg and other places weekly meetings for consultation and instruction were held.

TRESPASSING AND PILFERING

Against trespassing and pilfering notices in the press and the ordinary police system were usually relied

upon for protection, and generally proved efficient and sufficient. Many places report no complaints whatever. Ottawa had considerable trouble with trespassers at the start, but notices in the press, two arrests and stiff fines had the necessary salutary effect. Pilfering of light stuff was far too common, and night patrols had to be established, the plot-holders grouping together and taking turn about. However, the amount stolen was a very small percentage of the crop. Toronto reports little trespassing and little pilfering. Three convictions were had and were severely dealt with. Signboards were erected on every lot and special instructions given to the police. Guelph offered a reward of \$25 for the conviction of offenders, but there is no record of its having to be paid. Brantford had a dozen complaints to deal with, but a couple of examples in punishment had the desired effect. It is worth while noting that Halifax, Sherbrooke, Greenfield Park, St. Lambert, Westmount, Hull, Hamilton, Galt, London, Winnipeg and Saskatoon report no trespassing and no pilfering. St. Catherines, Guelph, Stratford, Windsor, Owen Sound, St. Thomas, North Bay, Sault Ste. Marie, Port Arthur, Regina, Edmonton and Victoria record that there was little of either offence. It is impossible to avoid saying that the reports generally show a high standard of public morality.

RECOMMENDATIONS TO OTHER ASSOCIATIONS

To a suggestion that associations might advise each other by counsel arising from their experience, a number of replies were received. The chairman of the Halifax association, for instance, says, "Don't multiply organizations; work along lines of least resistance and secure as much as possible co-ordination and co-operation." Greenfield Park suggests that its own example as outlined by this article be generally

followed. The business of the year was concluded with a resolution for a more determined and vigorous campaign in 1918. Toronto would like to see a meeting of secretaries at some central point during the winter for general consultation. Hamilton says, "Start in fall of previous year, engage one man to secure plots, supervise, instruct and attend to allotting of plots, fertilize wherever possible." The secretary for Guelph who is also secretary for the Y.M.C.A. says, "Greatest co-operation can be secured by a very small executive of well-known and tactful men who can inspire others to effort. These should not create a new society, but should enlist the co-operation of all agencies in the community. In case of younger boys and girls, a badge of recognition should be worn. A national badge would be even better." Galt recommends a small energetic council composed of a chairman, secretary and one other who would devote as much time as possible to more and better production and encourage beginners to keep their lots in the best possible shape. Stratford found that having a number of lots grouped together was the best plan, mutual helpfulness and a hearty rivalry working wonders.

Windsor's secretary suggests that it might be more economical to plough areas in several parts of the city rather than vacant lots, then sub-divide them. This, it is suggested, would save in ploughing and preparation. Fertilization would be easier. Rivalry would follow, and protection would be afforded by a community of interest. In addition an instructor could be more conveniently used. The City Clerk of Port Arthur says, "Get a few enthusiastic members to keep the meetings lively. Our fair was a great encouragement, and while the club will cost about \$700, the council says it has been the best spent money for many a year." Winnipeg says, "Organize in December or January, make up prize lists as early as possi-

ble in the year, hold public meetings for lectures and to carry on business at least once a month, offer good prizes and keep the organization before the people all the time." Brandon suggests there should be a national organization and co-operation for products by marketing, preserving, canning, pickling and formation of new industries, and some legislation enabling the use of vacant lands. Saskatoon would like to see ploughing and preparation for vacant lot

gardening done in the fall of the preceding year. Calgary says, "Get every person interested in the work. Have the wealthy people do actual work, and others will soon follow and the movement become popular." At Edmonton plans are on foot for the city to co-operate with the horticultural society with a view to the employment of a man for the whole year. There are twenty-three school gardens in Edmonton. The pupils chiefly cultivate potatoes.

ACTS RELATING TO AGRICULTURE

DRAINAGE IN ALL ITS PHASES

The following is a continuation of the article commenced in the November number of THE GAZETTE, when the legislation was reviewed relating to drainage in the Maritime Provinces and Quebec:

FIVE ACTS IN ONTARIO

Ontario has no fewer than five acts referring to drainage. These are: The Tile, Stone and Timber Drainage Act, The Municipal Drainage Act, The Ditches and Water Courses Act, The Municipal Drainage Aid Act, and The Provincial Aid to Drainage Act.

TILE, STONE AND TIMBER

The Act respecting Tile, Stone and Timber Drainage Debentures, which supersedes The Tile Drainage Act of the Revised Statutes of 1897, was passed by the provincial legislature in 1909 and amended in 1914, 1916 and 1917. It authorizes any municipality to issue debentures to an extent not exceeding \$100,000, and not less than \$2,000, bearing interest at the rate of 5 per cent, to be discharged within 10 or 20 years, for the purpose of loaning, at the same rate of interest, sums of one or more hundreds of dollars to owners of land in the municipality for the purpose of tile, stone, or timber drainage, the loan to be repaid in annual instalments covering ten or twenty years according to agreement. The debentures have to be made payable to the Treasurer of the province and must have coupons attached thereto calling for equal annual amounts of principal and interest. Not more than \$1000 can be lent to one person. Applications are to be considered in the order they are made. An inspector of drainage has to be appointed by the council, who will be responsible for the undertaking and report details as to the work required,

progress as made and any other information the council may desire. Authority for the work must be obtained through by-law and repayments can be collected by the same process as taxes. A borrower can make settlement in full at any time on adding 5 per cent to the amount due. A council borrowing money must make a full return to the Provincial Secretary, on or before the 15th January, of the amount expended in drainage, the number of rods of drain constructed, the names of the borrowers, particulars of the land upon which money has been lent, the names of persons whose applications have been refused, and the reasons for refusal, the report to cover the past year's operations up to December 31st. The repayments called for in the Act have to be remitted by the council to the provincial Treasurer within a month after the same became payable. Any delay causes the rate of interest to be raised during the time of the delay to 7 per cent. Any treasurer or officer of a municipality violating any provision of the Act becomes personally liable.

THE MUNICIPAL DRAINAGE ACT

The Municipal Drainage Act comprises 119 clauses. It provides that on the petition of a majority in the number of resident and non-resident persons, exclusive of farmers' sons not actual owners, the council of a municipality may appoint an engineer or an Ontario Land Surveyor to report upon the feasibility, the desirability and the cost of the work petitioned for, along with specifications. The Act specifically

applies to every case where the drainage work can only be effectually executed by embanking, pumping, or other mechanical operation, but in every such case the municipal council cannot proceed except upon the petition of at least two-thirds of the owners of land within the area described. If the water overflows on lands in another municipality recompense for any injury caused, or for any repair work required, is to be charged back to the owners of land in the drainage area. Any use of the outlet is to be paid for by assessment. The engineer or surveyor, in assessing the lands to be benefitted, need not confine his assessment to the part of the lot actually affected, but he shall nevertheless in his report show the approximate number of acres contained in the part affected by his assessment. Bridges and culverts that are necessary are to be charged in the work, but a municipality may pass a by-law for the purpose of assuming as a charge on the general funds of the municipality the whole or a portion of the construction and maintenance of all bridges and culverts rendered necessary by any drainage work crossing public highways. Provision is also to be made for the construction and enlargement of bridges rendered necessary, to be charged to the work but to be maintained by the owners. Allowance is to be made for any private ditch or drain or land that may be of value to the drainage work carried on under the Act. Any owner dissatisfied with the report of the engineer is at liberty to appeal to the referee appointed by the Lieutenant-Governor in Council for the purpose of administering the drainage laws. Immediately upon the filing of the engineer's report the clerk of the municipality is to notify the parties assessed of the assessment and the amount thereof. The engineer must file his report within six months of the filing of the petition. If he fails in this respect he forfeits all claim to compensation. Obstruction to the engineer in his work brings a penalty not exceeding \$100. The engineer can report in favour of covering a drain, but provision must be made for all the surface water from lands and roads draining naturally towards and into it. The engineer must determine whether the drainage work shall be constructed and maintained solely at the expense of the municipality employing him or at the expense of other municipalities interested and in what proportion. If the council think fit, it can have the engineer's bill of costs audited by the County Judge. When the council has decided upon carrying out the work it can pass a by-law authorizing it to borrow the funds necessary on the credit of the municipality, or to issue debentures in sums of not less than \$50 each and payable within 20 years, except in case of pumping and embanking drainage work, when the debentures can be made payable within

30 years, at not less than 4 per cent per annum. The by-law is also to provide for the levying of assessments in the same manner as taxes are levied. The by-law must be published once every week for four consecutive weeks in a local or county newspaper, along with the date that the court of revision will meet, and notifying anybody desiring to have the by-law quashed that he must, not later than ten days after the final passing of the by-law, serve upon the reeve or clerk of the municipality a notice of his intention to do so during the ensuing six weeks. The publisher is to be furnished with a list of the names and addresses of all persons within the municipality who are assessed, and is to make and file with the clerk a statutory declaration that each person has had mailed to him a copy of the first two issues of the paper containing the by-law. Instead of publishing in a newspaper the council may, by resolution, cause a copy of the by-law with the notices to be served upon each of the owners. If any are absent then a copy is to be sent by registered letter to the last known post office address of the absentee. If no notice is served of application to quash, or if such application has been unsuccessful, then the by-law is valid. A court of revision for purposes of the Act consists of five persons, three being a quorum. Evidence is to be taken under oath and any person having been tendered the proper witness fees, which are those of the Division Court, who fails to attend, incurs a penalty of \$20 with costs, recoverable by anybody suing for the same. Appeal from the court of revision can be made to the County Judge. In lieu of the interest on debentures being made payable annually it may be added to the debentures. Any owner of lands assessed, or the municipality, may pay the amount of the assessment, less the interest, before the debentures are issued. An irregularity in the by-law does not invalidate the debentures. A drainage work is not deemed to be continued into another municipality merely by reason of such drainage work, or some part thereof, being constructed on a road allowance forming a boundary line. An engineer, if necessary, may continue drainage work into an adjoining municipality and assess land owners benefiting thereby. In that case the council of the initiating municipality shall serve the other municipality or municipalities with a copy of the engineer's report, plans, specifications, assessments and estimates. The municipality so served must raise and pay over within four months from such service the sum received as its proportion of the drainage work, or, in the event of an appeal, the sum determined upon by the referee or Divisional Court. The municipality can appeal within six weeks of receiving the service. The municipality or municipalities through which the drain-

age work extends are responsible for maintenance of the same. If for the better maintenance of work constructed under this Act, or to prevent drainage to any lands or roads, it is deemed expedient to change the course of the work, or to make a new outlet, or to construct a tile drain under the bed of the work as ancillary thereto, or otherwise to improve, extend or alter the work, or cover the whole or any part of it, the council may proceed on the report of an engineer or surveyor without any petition being filed. The cost of such repair work if not provided for in the general funds can be assessed and collected in the same manner as the funds for construction. Municipalities can be compelled by mandamus from the referee to execute repairs. Councils can pass by-laws requiring owners to clean out a drain and keep the same free from obstructions. In case an owner neglects to do this the council can order the work done and charge the same, plus 10 per cent, against the owner in default. Any person obstructing or injuring any drainage work incurs a penalty of not less than \$5, nor more than \$100, and is liable to imprisonment for any term not exceeding six months, and, in default of payment, to a further term of imprisonment not exceeding three months. For the better maintenance of drainage work by embanking, pumping or other mechanical operation the council of the municipality initiating the work may, upon petition from two-thirds of the resident owners of a drainage territory, pass a by-law appointing a commissioner or commissioners to take charge with power to let contracts and do all that is necessary to carry on the work. Also upon the petition of two-thirds of the persons interested in any drainage work constructed by embanking, pumping or other mechanical operations, the council of the municipality in which the work is situated may assume and operate the same. A council can further assume on petition of a majority of the owners any drain constructed under The Ditches and Water-courses Act. Referees are to be appointed by the Lieutenant-Governor in Council, one for the counties of Stormont, Dundas and Glengarry, Prescott and Russell, Leeds and Grenville, Frontenac, Lennox and Addington, Prince Edward, Hastings, Northumberland and Durham, Victoria, Haliburton, Peterboro, Renfrew, Lanark and Carleton, and one for all the other counties in Ontario, at a salary not exceeding \$3,500 a year, together with reasonable travelling expenses. If one referee is absent the other has jurisdiction over the whole province. The referee has the powers of an Official Referee under The Judicature Act and the Arbitration Act and of arbitrations under any enactment relating to drainage work. In respect to all applications and proceedings before him, or which may come before him under

the provisions of this Act, or any former Act relating to drainage works, he has the powers of a judge of the Supreme Court, including the production of books and papers, the amendment of notices of appeal and of notices of claims for compensation or damages and of all other notices of proceedings. His decision, however, except in cases where the Act declares his judgment is final, are subject to appeal. From Section 103 to Section 116 the Act is devoted to the duties and jurisdiction of the referee and the last three sections deal with rules of court and tariff of costs.

DITCHES AND WATER-COURSES

The Ditches and Water-courses Act, 2 Geo. V., C. 74, according to section 2, does not affect the Acts relating to municipal or Government drainage work. A ditch is defined as meaning and including a drain opened or covered, wholly or in part, and whether or not in the channel of a natural stream, creek or watercourse, and also the work and material necessary for bridges, culverts, catch-basins and guards. The Act applies among other land to land for mining or manufacturing purposes. The council of every municipality is required to pass a by-law appointing a civil engineer, Ontario land surveyor or other competent person to carry out the provisions of the Act. The clerk of a municipality is to be paid for services performed by him in relation to the Act. No ditch, the whole cost of which, according to the estimate of the engineer or according to agreement, will exceed \$1,500 can be constructed under the Act. Every ditch constructed must be continued to a sufficient outlet, but must not pass through or into more than seven original township lots, unless the council of a municipality, upon the petition of a majority of the owners of the land affected, passes a resolution authorizing the extension. The land, the owners of which may be liable for the construction of a ditch, is that lying within one hundred and fifty rods from the sides and point of commencement of the ditch. The owner of land who requires the construction of a ditch, before filing his application with the clerk of the municipality, must in writing call a meeting of owners interested to consider the particulars. Notice must be given twelve clear days in advance of the meeting. Appeal against the proceedings can only be made on the ground that the person initiating them is not an owner. This appeal must be made within five clear days of the service of notice of meeting. If everybody is agreed the agreement must be signed in set form by every owner of land affected and within six days of the signing must be filed with the clerk of the municipality. If the ditch goes into more than one municipality the agreement must be in as many

parts as there are municipalities and a part filed with the clerk of each municipality. If all the owners have not been duly served with a notice of meeting the owners present on the day appointed may adjourn the meeting. If an agreement is not reached at the meeting, or within five days thereafter, the owner requiring the ditch can file a set requisition naming the several parcels of land that will be affected and the respective owners thereof, and requesting that the engineer appoint a time and place in the locality when he will attend and make an examination. If an occupant having been himself notified, fails to immediately notify the owner of the land of the proceedings that are being taken, he becomes personally liable for any damages that may result. If the engineer is convinced that the land of persons who have not received notice will be affected he is required to adjourn the proceedings until the law has been complied with in that respect. If the ditch proves to be a requirement, the engineer must within thirty days of his first attendance make his award in writing. Any person interfering or obstructing the engineer or assistant in his work is liable to a fine not exceeding \$100. Where rock cutting or blasting is necessary, and the engineer is of opinion that it could be better done by contract than by the owners, he may in his award direct that it shall be so done and apportion the cost to each of the several owners. If the engineer is of the opinion that the owner of any land through which the ditch runs is not benefited thereby he may relieve such owner from performing any part of the work and place it upon the other owners. Any owner affected by the award may within 15 days of the last notice of filing appeal therefrom to the County Judge. The clerk of the municipality must be served with notice of the appeal together with the particulars. The judge may order that the costs of the appeal shall be deposited before trial. An appellant can have the land inspected by any person he may choose. If the engineer is proven to have unduly favoured anyone he may be deprived of all fees. The judge is entitled to five dollars a day and travelling expenses for holding court to hear the appeal. The corporation is to defray all costs incurred within ten days of adjudgment of the case and repayment is to be made forthwith to the treasurer of the municipality by the parties concerned according to assessment. If any owner defaults 7 per cent is to be added to the amount charged against him and to be collected in the same manner as taxes. Any other municipality must pay a share of the costs to the municipality of origin and collect from the owners within its boundaries whose land is affected. The engineer if he finds the work not carried out according to his award, can take it over and let it out

to the lowest bidder. If the party concerned fails on notice to pay for the work done 7 per cent is to be added and the amount placed upon the tax collector's roll. If any owner desires to make use of the ditch for draining land other than that originally contemplated he can avail himself of the provisions of the Act. The Act applies to the deepening, widening and covering, of any ditch already or subsequently constructed. Ditches constructed or changed under the Act are to be maintained by the respective owners. Any failure to do this can be complained of by another owner, and the engineer within 30 days, if the notice is disregarded, can cause the work to be done and charged against the owner in neglect. An owner interested in any other ditch not constructed under this Act, but under another Act, can take proceedings under this Act for improvement of the same. At the expiration of two years after the completion of a ditch, whether constructed under this or any other Act, an owner can take proceedings for reconsideration of the agreement or award under which the construction took place. If a ditch proves insufficient for the purposes for which it was constructed any party to the agreement or award can, after six months have elapsed from its completion, take proceedings for reconsideration. An engineer neglecting for 30 days to make an inspection asked for, incurs a penalty of not less than \$5 nor more than \$10. Councils must keep printed copies of all the forms required by the Act.

THE MUNICIPAL AID ACT

The Municipal Drainage Aid Act, assented to in 1909, provides that the council of a township, having passed a by-law for work under The Municipal Drainage Act, may, at the termination of the time limited for serving notice of intention to make application to quash the by-law, apply to the Provincial Treasurer for the purchase by the province of the debentures authorized thereby. The Treasurer is to investigate the proposition and report to the Lieutenant-Governor in Council. The Treasurer must not certify to the propriety of the investment where the aggregate amount of the rates necessary for the expenses of the municipality for the last completed financial year exceeds three cents in the dollar on the value of the ratable property within its jurisdiction, or where the amount of the debentures to be issued exceeds \$60,000. The amount invested in the purchase of the debentures of any municipality must not be more than \$20,000, and the sums so invested by the province must not at any time exceed \$500,000 in the aggregate. The Lieutenant-Governor in Council may authorize the advance of the whole par value of the

debentures, or the retention of a percentage until the Minister of Public Works has reported that the work has been completed and inspected. The debentures cannot be questioned in any court. The amount payable in each year for principal and interest is to be remitted to the Provincial Treasurer within one month after becoming payable. Payments that are due and not settled at that time become subject to interest at the rate of 7 per cent per annum. If the default continues the council is to assess and levy on the whole ratable property within the municipality a sum over and above the other valid debts of the corporation falling due within the year sufficient to meet the liability. The amount in arrear and the interest is to be the first charge upon all the funds of the municipality other than sinking funds. The treasurer of the municipality is forbidden to pay out any money, except for salaries and ordinary current disbursements and for debts due to the province, until the amount in arrear shall have been paid with interest to the Provincial Treasurer. If the treasurer of the municipality disobeys this injunction, or any of the provisions of the Act that come within his province, he becomes personally liable for the full amount in arrear with interest.

THE PROVINCIAL AID ACT

The Provincial Aid to Drainage Act was passed by the Legislature in 1911. The Act applies to the portion of the trunk channel constituting the outlet of any drainage work, any work for the purpose of carrying a drainage work through intervening high land to a natural or other outlet and any work for the purpose of rendering more effective a drainage work by embanking, pumping or other mechanical means. The council of a municipality may, after adopting the engineer's report, apply to the Lieutenant-Governor in Council for aid, at the same time setting forth the reasons why the whole cost of the work should not be assessed upon the land which would be liable to assessment under The Municipal Drainage Act, at the same time supplying a verified copy of the engineer's report, a statement of the cash value and the assessment of the land and a field plan of the proposed work. An engineer of the Public Works Department is then to make a full report on all matters alleged in the application and upon his report the Lieutenant-Governor in Council may pay out of the Consolidated Revenue Fund such proportion of the cost of the undertaking as he may deem reasonable, after approval by resolution of the Legislature.

MANITOBA'S METHODS

The Land Drainage Act of Manitoba, as given in the Revised Statutes of 1913, comprises 64 sections. On the petition of

a majority of the property holders interested, the Lieutenant-Governor in Council may organize the lands or territory covered into a drainage district. Previous to this being done a competent engineer is to report upon the probable cost and as to whether the work would be a public benefit. Upon receipt of the report the Minister of Public Works, under whom the Act is administered, must submit the same to the Lieutenant-Governor in Council. The work being approved the cost is to be apportioned according to the engineer's estimated value of the benefit received. Debentures of the district bearing the seal of the province, are then to be issued for a period covering not less than twenty years, nor more than thirty-five, at a rate of interest not exceeding 6 per cent per annum. The Lieutenant-Governor in Council, if thought advisable, can guarantee such debentures or the funds of the province can be invested in them to the extent of not more than \$200,000. Exemption from collection for the first five years can be granted. The assessment on land benefited by the drain cannot be raised until the debentures have been fully paid. When the debenture debt of any drainage district has been reduced to \$8,000 or less the province may assume the balance of the liability. Lands outside a recognized district using the drainage work for an outlet are to be charged for the same according to the benefit derived. Obstructions must be removed on the order of the municipal council or the council may order the removal and assess the cost against the owner of the lands in obstruction with 10 per cent added thereto. The Minister may authorize the construction of bridges or culverts throughout the course of the work, or he can continue the drain beyond the lands interested to provide any outlet required. Extension work can be undertaken by a council to the extent in value of \$2,000, but beyond that amount any work necessary is to be undertaken by the Minister, the cost not to exceed \$5,000 and to be levied upon the lands. Municipalities are responsible for the maintenance of the drainage work. In the Minister is vested the power to award payment for any damages caused by the performance of the work. The special drainage tax must in no case be allowed to be in arrears for more than two years. The removal or defacement of signs put up by order of the engineer brings a penalty of not less than five dollars, nor more than a hundred dollars, or sentence to imprisonment for a term not exceeding six months. Wilful obstruction to the drain entails a fine of not less than five dollars nor more than fifty, and in default of payment to imprisonment for not less than one week, nor more than two months. Treasurers of municipalities disobeying the Act may be dismissed from office by the Lieutenant-

Governor in Council and be prosecuted, in which case they become liable a to fine of one hundred dollars or to imprisonment for terms not exceeding six months.

DRAINAGE ACT OF SASKATCHEWAN

In The Drainage Act passed by the Saskatchewan Legislature in 1909 and amended in 1913, the definition of drainage work is given as the construction of a drain, or drains, the deepening, straightening, widening, cleaning of obstructions, or otherwise improving any stream, creek or water-course and the lowering of waters of any lake or pond and the construction of guards necessary therewith." As in Manitoba, so in Saskatchewan, The Drainage Act is under the administration of the Minister of Public Works. While, however, the Manitoba Act requires a petition from a majority of the property owners before a drainage district is formed, the Saskatchewan Act requires a petition from the resident owners of at least one-half the area of the lands of resident owners interested before such a step is taken. The Minister is to appoint an engineer on the organization of a district whose duties will be the same as described in the Manitoba Act. Indeed, henceforth the working provisions of the Saskatchewan Act are to all intents and purposes the same as the Manitoba Act, the secretary or treasurer of the municipality in which the work lies for purposes of the Act being in each case an officer of the Minister. For defacement or removal of authorized signs penalties are the same, as is also the liability to prosecution of an offending treasurer of a municipality. For wilful injury or obstruction to the work the penalty under the Saskatchewan Act must not exceed \$200. By the amendment of 1913 right of appeal to the County Judge against any assessment is given and the right of withdrawal from a petition is further described. No provision is made for assumption by the province of the debenture debt when it has been reduced to a certain amount, as is the case in Manitoba.

ALBERTA'S DRAINAGE ACT

All the drainage acts of the Prairie Provinces and those of British Columbia are under the administration of the Minister of Public Works. As in Saskatchewan so in Alberta, in addition to The Drainage Act there is a measure cited as The Private Ditches Act. The Alberta Drainage Act was passed in 1908 and revised in 1916. The definition of drainage work is identical with that of the Saskatchewan Act. A petition from the owners of at least two-thirds of the land affected is required before a district is organized. The Minister can then appoint an engineer to report upon the necessity for the work and the cost thereof. After that the procedure lies upon the same lines as in the other Prairie

Provinces. Appeal against assessments to the County Court Judge is also provided for. In Manitoba and Saskatchewan the debentures issued to defray the cost of the work are to run for not less than 20 years, nor more than 35 years, but in Alberta they can be made to run for not less than ten years. The rate of interest in each case is not to exceed 6 per cent. In other respects also the operative provisions of the Act are practically the same as in the other Prairie Provinces, including the penalties for defacement of signs. For injury to the work the liability incurred under the Alberta Act is not less than \$5, not more than \$200, and in default of payment imprisonment for not less than one week nor more than two months. No provision is made for the assumption by the province of any part of the debenture debt.

PRIVATE DITCHES' ACTS

Both Saskatchewan and Alberta have on their statute books a measure cited as The Private Ditches Act. Except as regards the limit to the cost of the work and in a few minor particulars, the Acts are identically the same, even to the number of clauses (39) which they contain. The limit to the cost of the work that can be undertaken under the Act in Saskatchewan is \$2,000 and in Alberta \$5,000. A ditch is described as meaning and including "a drain open or covered wholly or in part, whether in the channel of a natural stream, creek or water-course or not, and also the work and material necessary for bridges, culverts, catch basins and guards." The owner of a parcel of land requiring a ditch to be made must notify in writing the owners of other lands affected, and summon them to a meeting at a place near the site of the proposed ditch on a certain day and date not less than twelve days after the notice has been issued. If an agreement is reached it must be reduced to writing and filed with the secretary of the municipality. If an agreement is not reached the party of the first part can file a requisition giving all the details required in a set form with the secretary of the municipality. Upon receipt of the requisition in either case an engineer is to be appointed to report upon the work proposed and the cost thereof. If the engineer reports that the ditch is required then the work can be undertaken, and the same procedure followed as to the apportionment of the expenditure and the collection thereof practically as set forth in the Drainage Act of the respective provinces. Appeal can be made against any ruling to the District Judge. If heavy work is required the engineer can let it out by contract. The treasurer of the municipality is authorized to pay for such work and to assess the cost to the owners profiting. If they do not pay forthwith 10 per cent. is to be added to the amount due, and collection made as in the case of municipal taxes.

BRITISH COLUMBIA.

In 1913 British Columbia repealed the Dyking, Drainage and Irrigation Act, given in the revised Statutes of 1911, and passed another Act bearing the same title. In the following year "Irrigation" was struck out, and the measure left to stand as The Drainage and Dyking Act. The Act covers everything that is necessary for drainage or dyking. When the owners of any land desire to make use of the powers granted under the Act, they can petition the Lieutenant-Governor in Council for the appointment of three commissioners, naming them themselves, to execute and maintain the same. The petitioners are also required to describe the lands affected and to give a name to the proposed district. Notice of the petition must be given in a local paper and in the provincial *Gazette*. To secure action the petition must be signed by a majority in value of the owners. Upon the work being authorized by order-in-council the Commissioners become a body corporate and solely responsible for carrying on and maintaining the work. They can fix their own remuneration, but it must not exceed \$5 a day while actually engaged in the duties entailed, nor must it exceed \$100 a year each. They can appoint an engineer, but the appointment must be confirmed by the Lieutenant-Governor in Council. The work is to be carried on and paid for in the same manner as similar work in the Prairie Provinces. Appeals against assessment must be made to the Court of Revision. The same rights are vested in the Crown lands as in those of private owners. Appeal as to assessment can be taken from the Court of Revision to the County Court Judge. Assessments are the first charge upon the lands. If the majority pray for a new assessment such can be made on the report of the engineer. The Commissioners are given powers of expropriation, by arbitration if an agreement cannot otherwise be reached. If a bridge is necessary the Commissioners must pay for the same. Owners must supply men and implements for the work on requisition, or the Commissioners can supply the same themselves. Appeal can be taken from the engineer to the County Court Judge. The Commissioners are empowered to borrow and issue debentures upon the security of the lands or can borrow upon security of the taxes. Inspection engineers can be appointed by the Lieutenant-Governor in council. If any person disobeys an order of the Commissioners or wilfully damages any of the works a fine not exceeding fifty dollars must be paid for every offence. By an amendment passed in 1915 sales of lands can be ordered for default in payment of assessments or fines. The sheriff must give three months' notice of sale and is entitled to charge three per cent on the amount realized.

DITCHES AND WATER-COURSES.

British Columbia has a Ditches and Water-courses Act, the main provisions of which, excepting altogether in the wording and in the arrangement of the sections, are identical with those of the Ontario Act excepting also that, whereas in Ontario the limitation of cost under the Act is \$1,500, in British Columbia it is \$2,500. The British Columbia Act further contains a section especially referring to railway companies. Arrangements can be entered into between the companies and the municipality whereby the companies can construct a ditch or culvert, for which the municipality is to pay and assess the cost among the land owners, exclusive of any part for which the municipality may be liable under the award. Except with the consent of two-thirds of the owners no special liability is to be imposed on them on this account. The cost of such work on railway lands is to be exclusive of the limit of \$2,500 allowed as the total cost of the work. The Ontario Act covers the case by providing that the period (thirty days) prescribed for the engineer to make his award shall be exclusive of the time required to obtain the approval of the works or the specifications or the plans thereof, where such approval is necessary, of the Ontario Railway and Municipal Board or the Board of Railway Commissioners for Canada. There is in addition a difference in the notice to be given by the engineer in the letting of incompleted work. The Ontario Act requires that four days' notice shall be given, but the British Columbia Act calls for six days.

NOTE.—Articles and symposia on farm drainage and land drainage will be found in THE AGRICULTURAL GAZETTE as follows:

Vol. I. Experimental Work in Manitoba, page 115; Farm Drainage, Ontario, page 373; Farm Drainage, Quebec, page 377; Farm Drainage, Prince Edward Island, page 378; Tiled Drainage Act, Prince Edward Island, page 488; Drainage Campaign in Manitoba page 495; Drainage Demonstration, New Brunswick, page 659.

Vol. II.—Tile Draining at Agricultural College, Manitoba, page 450; Under-draining in Nova Scotia, page 1092.

Vol. III.—Farm Drainage, Prince Edward Island, page 325; Farm Drainage Nova Scotia, page 327; Farm Drainage, New Brunswick, page 327; Farm Drainage, Quebec, page 329; Farm Drainage, MacDonald College, page 329; Farm Drainage, Manitoba Agricultural College, page 330; Drainage Work for 1916, Ontario, page 441.

Vol. IV.—Land Drainage Prince Edward Island, page 186; Nova Scotia, page 187; New Brunswick, page 187; Quebec, page 189; Ontario, page 190; British Columbia, page 192; Acts Relating to Agriculture (Drainage in all its Phases), pages 989 and 1097.

STUDENT ENROLMENT, 1917-18

THE following table shows the number of students enrolled at the Agricultural Schools and Colleges and the Veterinary Colleges in Canada for the college year 1917-18:

NOVA SCOTIA

AGRICULTURAL COLLEGE, TRURO	
First year	29
Second year	26
Total	55

In comparison with former years' attendance the great majority of these boys are in their teens, that is, below military age. This is a little less than half the pre-war attendance.

QUEBEC

MACDONALD COLLEGE			
School of Agriculture.			
	Men	Women	Totals
1st year	25	3	28
2nd year	14	--	14
3rd year	4		4
4th year.	9	2	11
Totals.			57

School of Household Science.

Institution Administration Senior	5
Institution Administration Junior	7
Homemakers.	41
Autumn Short Course.	11
Total	64

OKA AGRICULTURAL INSTITUTE, LA TRAPPE

1st year	13
2nd year	31
3rd year	21
4th year	19
Special courses	31
Total	115

SCHOOL OF AGRICULTURE, STE. ANNE DE LA POCATIÈRE

Short Course:	
First year	36
Second year	26
	62

Agricultural Course:	
First year	25
Second year	23
Third year	12
	60
Total, 122.	

ONTARIO

AGRICULTURAL COLLEGE ATTENDANCE

Statement of attendance at the Ontario Agricultural College, Guelph, fall term commencing September 21st, 1917.

Agricultural Classes—	
First Year	76
Second year	32
Third year	39
Fourth year	36
Normal Course in Manual Training...	4

Classes at Macdonald Institute—

Normal domestic science —junior...	13
“ “ “ —senior	12
Associate, —junior.	16
“ —senior	9
Third year	4
Housekeeper, —junior	21
“ —senior	9
Homemaker, —“A”	19
“ —“B”.	6
Short course in domestic science. . .	15
Student workers...	2

Total attendance 313

MANITOBA

AGRICULTURAL COLLEGE

The following statement gives the number of students enrolled in each of the years in agriculture and home economics at the Manitoba Agricultural College. Twelve farm boys of the first year and nine of the second year have applied for admission.

Agriculture:	
1st year	56
2nd year	17
3rd year, diploma	4
3rd year, degree	16
4th year	11
5th year	9
	113

Home Economics:	
1st year.	47
2nd year	13
3rd year	13
4th year	5
5th year	6
	84

Total, 197.

SASKATCHEWAN

AGRICULTURAL COLLEGE

Associate Course:	
First year	66
Second year...	13
Third year...	9
	88

B. S. A. Course:

Freshman.	9
Sophomore.	6
Junior.	2
Senior.	5
	22

Total, 110.

ALBERTA

COLLEGE OF AGRICULTURE

Agriculture:

First year.	15
Second year	4
Third year	17
Fourth year	5
Fifth year	9
	50

Household Science:

First year	1
Total, 51.	

SCHOOL OF AGRICULTURE, VERMILION

Men: 1st year 32; 2nd year, 10.
 Women: 1st year 4; 2nd year, 5.

At the date of making this return (Nov. 3) it was expected the first year's men's class would be increased to 40, and the second year's class to 14 men, the first year women's class to 8, and the second year women's class to 9.

SCHOOL OF AGRICULTURE, CLARESHOLM

First year girls	20
First year boys	60
Second year girls	7
Second year boys	15
Total.	102

SCHOOL OF AGRICULTURE, OLDS

Following is the enrolment of students for the various classes for the present college year:

	Boys	Girls
First year.	56	29
Second year.	18	18
Total.	74	47

In addition to these we have eighteen wounded returned soldiers who are taking re-training in agriculture.

The ages of boys who are registered with us this year run from sixteen to nineteen. Before the war the average age of students was between twenty-one and twenty-two years.

BRITISH COLUMBIA

COLLEGE OF AGRICULTURE

On September 25th the first class in agriculture in the University of British Columbia was enrolled. Seven students were registered for this course. The only work leading to the Degree of B.S.A. is that being given to the Freshman class.

The University has not yet organized a department of Household Science.

MONTREAL

SCHOOL OF COMPARATIVE MEDICINE AND VETERINARY SCIENCE

First year	14
Second year	18
Third year	11
Total.	43

TORONTO

ONTARIO VETERINARY COLLEGE

Following is the enrolment of students for the various classes for the present year:

First year	18
Second year	32
Third year.	49
Total.	99

The falling off of students in the first year class is no doubt due to some extent to the fact that a four-year course is starting this year, and also to the great need of young men for the army.

ASSOCIATION OF AMERICAN AGRICULTURAL COLLEGES AND EXPERIMENTAL STATIONS

THE Thirty-first Annual Convention of the Association of American Agricultural Colleges and Experimental Stations was held at Washington, D.C., November 14th to 16th. The attendance included the leading men and women directing agricultural and home economic education in all the forty-eight States of the Union. Between three and four hundred were registered.

In addition to questions of policy and plans for the improvement of the regular

work being carried on in the various institutions, the programme this year dealt largely with subjects concerning the colleges in their efforts to contribute as fully as possible towards winning the war. The following topics as examples, will be of interest to leaders in agricultural work in Canada at the present time:—"The best things done by the Colleges to aid the Government in the war emergency"; "How the Land Grant College organizations may be planned to serve the Govern-

ment in the war emergency"; "Federal programme for extension work during the war", and "The necessity and purpose of food conservation".

Notable features of the programme also were addresses by Hon. D. F. Houston, Secretary of Agriculture, and Herbert Hoover, Food Controller. Mr. Houston outlined very clearly the understanding which has been arrived at between his Department and the Food Controller, in regard to stimulating food production within the nation. At the beginning of the campaign misunderstandings occurred, but it has now been arranged that the De-

partment of Agriculture, assisted by the State Agricultural Colleges and their affiliated organizations, shall have entire charge of all efforts towards increasing food production.

Mr. Hoover placed clearly before the meeting the serious aspects of the present food shortage, and showed the probability of an even more serious condition existing later. He made a stirring appeal to the agricultural leaders to put forth the most strenuous efforts to awaken producers to a realization of humanity's need. "Food," he said, "would win the war; food might lose the war."

ASSOCIATIONS AND SOCIETIES

NEW BRUNSWICK WOMEN'S INSTITUTES

The fifth annual convention of the New Brunswick Women's Institutes was held at Moncton, October 2nd, 3rd and 4th. The report of the Supervisor, Miss Hazel E. Winter, indicated an increase of ten branches since November, 1916, making a total of 92, with a membership of 2,600. The financial statements of seventy-five institutes showed that from July, 1916, to June, 1917, there had been \$14,505.61 raised and that the expenditure had been \$11,361.48. An additional \$2,641.03 was recently raised by 71 institutes and sent to Halifax as a gift from the New Brunswick Women's Institutes to the Y.M.C.A. war fund. During the summer of 1917, 102 meetings were held, at which the attendance was 4,913. At last winter's apple show in St. John, 22 institutes exhibited 535 jars of fruits and vegetables and the Department awarded \$50 in prizes. At this year's convention 43 institutes exhibited 469 jars of canned fruits, vegetables and meats and the Department gave \$101 in prizes. For the best average attendance of members at meetings and the most carefully planned and carried out programmes from January, 1918, to June 30, 1918, six prizes amounting to \$90 would be distributed. Prizes would also be given for the best written essays on "Thrift and Economy", "Systematic House-keeping", and "Advantages to a Community of Having a Women's Institute". The Department would give three prizes for each subject, amounting to \$66. The

essays are not to exceed 1200 words and should be in by December 31st of the present year.

A number of papers were read at the different sessions on appropriate subjects and at the close a series of resolutions were carried. These urged the Food Controller to so regulate the price and distribution of feed to the farmer as to enable him to produce the supply of milk necessary and to regulate the price of milk to the consumer; asked that a woman be placed on the Provincial Board of Censors for Moving Pictures; urged mothers to endeavour to secure medical inspection of schools; suggested the advisability of making it possible for women, other than ratepayers, to become members of rural school boards; urged that other grains, besides wheat, used for food and feed purposes, should not be used in the making of spirituous liquors; pledged the hearty support of the women to the Food Controller; asked the co-operation of the Provincial Department of Agriculture with the University at Fredericton in securing a system of lending libraries; suggested that women should be appointed on hospital and municipal home boards and urged that women should be appointed to the various governing bodies of the board of health, as it is upon them that the evils resulting from public uncleanliness principally fall. Miss Winter, the supervisor, was presented with a club bag.

ONTARIO HORTICULTURAL ASSOCIATION

At the annual meeting of the Ontario Horticultural Association, held in Toronto on November 23rd, the following officers were elected: President, T. D. Dockray, Toronto; First Vice-President, Prof. J. W.

Crow, O.A.C., Guelph; Second Vice-President, Wm. Hartry, Seaforth; Secretary and Editor, J. Lockie Wilson, Toronto; Treasurer, C. A. Hesson, Toronto; Hon. Director, Dr. F. E. Bennett, St. Thomas.

QUEBEC STOCK BREEDERS' ASSOCIATION

BY DR. J. A. COUTURE, SECRETARY

The eighth annual sale of pure-bred stock of the General Breeders' Association of the province of Quebec took place on the 10th of October at Montreal, and on the 17th of October at Quebec. There were put up for sale 295 animals, namely:— 97 cattle, 122 sheep and 76 swine. The cattle, which were mostly all calves ranging from 6 to 10 months of age, comprised

70 Ayrshires, 20 French Canadians, 7 Holsteins. The sheep comprised 19 Cotswolds, 47 Leicesters, 12 Lincolns, 22 Hampshires, 9 Oxfords, 9 Shropshires and 4 Cheviots. The swine comprised 39 Yorkshires, 28 Chesters, 8 Tamworths and 1 Berkshire. A detailed statement of the sale at both places is given below:—

BREED AND KIND	AT MONTREAL			AT QUEBEC		
	Number of Animals Sold	Highest Price Obtained	Average	Number of Animals Sold	Highest Price Obtained	Average
CATTLE.						
Ayrshires	26	\$150	\$80	44	\$146	\$78
French-Canadians	7	80	67	13	135	83
Holsteins	3	75	88	4	117	86
SHEEP:						
Leicesters	16	65	46	31	55	42
Cotswolds	12	49	31	7	35	32
Lincoln	7	39	35	5	65	38
Shropshires	3	65	40	6	40	32
Hampshires	12	70	42	9	51	38
Oxfords	6	80	48	3	67	54
Cheviots	2	46	40	2	54	40
SWINE						
Yorkshires	16	100	68	23	97	57
Chesters	10	71	60	18	71	42
Berkshires	1	50				
Tamworths	4	53	48	4	60	42

Average for all of the cattle \$78 at Montreal; \$82 at Quebec.

" " sheep 41 " 41 "

" " swine 56 " 47 "

The animals were scattered throughout the province, having been bought by 87 agricultural clubs, 3 agricultural societies and 44 private individuals. The expenses incurred in connection with the sale amounted to 35 per cent of the purchase price of

the animals. The association is also making a sale of pure-bred sheep at fourteen points on the Intercolonial Railway from Levis to Rimouski, between November 13th and December 5th.

UNITED FARMERS OF ONTARIO

A convention of the United Farmers of Ontario and the United Farmers' Co-operative Association Company, Limited,

will be held at Toronto on December 19th, 20th and 21st. J. J. Morrison, Secretary, United Farmers of Ontario.

WESTERN CANADA LIVE STOCK UNION

The Fifth Annual Convention of the Western Canada Live Stock Union was held at Regina, Sask., on November 14th and 15th. Dr. J. G. Rutherford, president of the Union, occupied the chair. Addresses were delivered at the opening by the Lieutenant-Governor, the Premier of the Province and the Deputy Minister of Agriculture for Saskatchewan. Mr. J. D. McGregor, representing the National Food Control Commission, impressed very strongly on the convention the necessity of increased live stock production and especially of swine. Mr. D. Johnston, of the Dominion Live Stock Branch, dealt with

the transportation facilities afforded Western Canada. Mr. G. H. Hutton, of the Dominion Experimental Station at Lacombe, Alta., went very thoroughly into the general live stock situation, quoting statistics to illustrate the extreme seriousness of existing things.

Resolutions passed at the meeting of Western representatives in Ottawa in connection with the pork production campaign were taken into consideration, and, after thorough discussion, resolutions were passed urging that every care should be taken to exempt experienced labour on farms as far as possible; that alien labour

should be conscripted to work on farms; expressing appreciation of the Live Stock and Live Stock Products Act and respectfully urging that it be put into force at the earliest possible moment; urging the provincial Governments to remove to as great an extent as may be found possible, the burdens imposed upon the live stock industry by the existing herd laws, thus rendering available areas of grazing lands at present going to waste; asking the removal of the war import tax on corn and similar feed

stuffs entering Canada; urging that, as a war-time measure, cities and other urban municipalities relax their regulations *re* the keeping of pigs within their boundaries, thus enabling householders to utilize garbage to the fullest extent, and requesting the committee of the Union on transportation to investigate existing transportation problems and to take such action as may be deemed necessary on behalf of the live stock interests of the West.

A "GUIDE" SEED FAIR

The Grain Growers' Guide held its first seed fair at Winnipeg on November 1st and 2nd. In preparation for this fair *The Grain Growers' Guide* last spring distributed to farmers at over 420 different points throughout Western Canada selections of the best registered seed obtainable. All this seed was grown in the Prairie Provinces under the rules and regulations of the Canadian Seed Growers' Association and registered by that body. At the same time as the seed was distributed the United Grain Growers Limited announced the offering of \$500 in gold as prizes for the seed fair. *The Guide* also provided to each person who received seed, instructions for its treatment and cultivation. Each grower was required to supply for the seed fair one-half bushel and a small sheaf of the grain. The judges selected for the seed fair were Seager Wheeler, thrice winner of the world's championship for registered wheat; George Seals, chief grain inspector for Western Canada, and Professor T. Harrison of the Field Husbandry Department of the Manitoba Agricultural College. So large was the exhibition and so keen the competition that it occupied two and a half days of the time of these judges in placing the awards.

In awarding the prizes the judges allotted 300 points for the grain and 100 points for

the sheaf. The points for the grain were 150 for freedom from weed seeds, other kinds of grain, useless impurities and smut and purity of variety, 150 points for soundness of grain, freedom from rust, frost, etc., damage, uniformity of size, trueness of type, milling value and uniform colour. The points for the sheaf were 25 for general appearance, 10 for freedom from weeds and other grains and 65 for quality of the heads and the grain in the head. In wheat 42 entries were secured, these scored in the sack from 293 $\frac{1}{4}$ to 234 points. For sheaves the score ran from 91 $\frac{1}{4}$ to 70. Twenty money awards were allotted, the first being \$100 in addition to a gold medal donated by Dr. Jas. W. Robertson, down to \$3.00 for the twentieth prize.

Four prizes were awarded for barley and four for oats, ranging from \$25 to \$7 for barley and \$40 to \$8 for oats. Barley scored for grain 282 to 249 and for sheaf 90 $\frac{1}{4}$ to 78 $\frac{1}{2}$. For oats the scores were for grain 274 $\frac{1}{2}$ to 239 $\frac{1}{4}$ and for sheaf 96 to 87 $\frac{1}{2}$. Each exhibitor will be given his score card so that he may learn wherein his exhibits were deficient.

It is announced that *The Grain Growers' Guide* has already selected seed for distribution this coming spring for the second seed fair to be held next fall.

AGRICULTURAL RELIEF OF THE ALLIES COMMITTEE

The committee in Manitoba for the Agricultural Relief of the Allies Fund is as follows:—President, R. C. Henders, President of the Grain Growers' Association; Vice president, J. B. Reynolds, Pres. Agricultural College; Secretary treasurer, J.

H. Evans, Acting Deputy Minister of Agriculture; Directors, R. McKenzie, Secretary Canadian Council of Agriculture, and S. A. Bedford, Chairman Weeds Commission.

THE SASKATCHEWAN LIVE STOCK ASSOCIATIONS

At a joint executive meeting held in Regina on November 16th, it was decided to have the annual meetings of the associations take place in Regina on January 3rd and 4th next. While those present agreed that the College of Agriculture at Saskatoon

offered superior facilities for the holding of the meetings, it was generally admitted that, due to conditions arising from the war, such as labour shortage, which would make it difficult for farmers to be away from home for any length of time, only business

meetings should be held and, for this year, at least, demonstrations and lectures should be dispensed with. These meetings will include the Saskatchewan Cattle,

Horse, Sheep, Swine and Poultry Breeders' Associations. The Secretary is P. F. Bredt, B.S.A., Department of Agriculture, Regina.

SASKATCHEWAN DAIRYMEN'S CONVENTION

The annual convention of the Saskatchewan Dairymen's Association will be held at the University of Saskatchewan, on January 9th and 10th. In addition to the regular features this year there will be a Creamery Butter Makers' Competition. Each month since May a fourteen pound box has been sent into storage from the creameries which are competing so that when the butter comes to be judged, six boxes from each creamery will be examined. The three scoring first place, in addition to being awarded prizes of \$30, \$25, and \$20, respectively, will go into com-

petition with the three best from Alberta and Manitoba at the interprovincial contests to be held in Winnipeg at the time of the meeting of the Manitoba Dairymen's Association. Prizes for this contest are \$60, \$40, and \$25, for the first, second and third, respectively.

In addition to the Butter Makers' competition, it is hoped to have a butter judging competition, open to creamery managers and their assistants, also a boys' stock judging competition. The secretary of the association is K. G. MacKay, M.Sc., Professor of Dairy Husbandry.

ALBERTA CATTLE BREEDERS' SALE

A dairy cattle and swine sale was held at Calgary by the Alberta Cattle Breeders' Association on October 30th. Thirteen Holsteins sold for \$1280.00, the average being \$98.50, and one dairy Shorthorn fetched \$125.00.

In the swine sales, eighteen Duroc Jerseys sold for \$468.00, an average of \$26.00.

Thirty-two Berkshires sold for \$1460.00, an average of \$45.60, and one Poland China brought \$30.00. At the same sale the Canada Land and Irrigation Company disposed of twelve Berkshire boars at an average price of \$42.58. The highest price in the swine sale was paid for a Berkshire boar, namely, \$111.00.

ALBERTA SHEEP BREEDERS' SALE

A record sale of sheep was held by the Alberta Sheep Breeders' Association at Calgary on October 31st. Two hundred and twenty-nine ewes were sold for \$5,258.75, an average of \$22.95, and one hundred and twenty-three rams for \$5,008.00, an average of \$40.70, the grand total being three hundred and fifty-two sheep for \$10,266.75, an average of \$29.16. The different breeds sold as follows:

Ewes	No.	Value	Average
Shropshire	64	\$1720 00	26 87
Oxford	36	1125 00	31 25
Grade	27	482 50	17 87

Grade Oxford	100	1841 25	18.41
Suffolk	2	90 00	45 00
Totals	229	5258 75	22 95

Rams.	No.	Value	Average
Shropshire	75	2215 00	29 50
Suffolk	14	1008 00	72 00
Oxford	33	1765 00	53 50
Southdown	1	20 00	20.00
Totals	123	5008.00	40 71

The highest price paid for a Suffolk ram lamb was \$112.00; the highest price for a shearing Oxford ram was \$250.00.

ALBERTA SHEEP AND SWINE BREEDERS' SALE

The second annual sheep and swine sale of the Alberta Provincial Sheep and Swine Breeders' Association took place in the stock pavilion on the exhibition grounds at Edmonton on Friday, November 2nd. The number of entries was limited in order that there should be no surplus, if possible, over the demand. The result was most satisfactory.

Fifty-nine pure bred sheep were sold at an average price of \$51.29; thirteen Shropshire rams for \$698.00, an average of \$53.70; six Shropshire ewes for \$154.00, an average of \$25.67; sixteen Oxford rams

for \$1035.00, an average of \$64.70; twenty-one ewes for \$1113.00, an average of \$53.00; three Hampshire ewes for \$95.00, an average of \$31.67. Twenty-five grade ewes sold for \$446.00, an average of \$17.84. In all eighty-four sheep were sold and the total amount realized was \$3,541.00.

Twenty-one swine were sold for a total of \$934.00. One Yorkshire sow fetched \$50.00; three Duroc-Jersey boars sold for \$100; three sows for \$118; eight Berkshire boars for \$379, an average of \$47.38; and six Berkshire sows for \$287, an average of \$47.83.

BRITISH COLUMBIA WOMEN'S INSTITUTE CONFERENCES

Conferences of Women's Institutes of British Columbia were held at Vernon, Cranbrook, Duncan and Mission City in September and October, each of two or three days' duration. The programmes consisted largely of reports of institutes and discussions on national, local and household subjects. The attendance at

the different sessions varied from 40 to 150. Following are the officers of the advisory board of women's institutes for the province: Mrs. Jas. Johnstone, Nelson, Convener; Mrs. M. S. Davies, Chilliwack, Secretary; Mrs. Blackwood-Wileman, Duncan, and Mrs. R. L. Lipsett, Summerland, members.

CANADIAN BROWN SWISS ASSOCIATION

Mr. Ralph H. Libby, Stanstead, Que., Secretary of the Canadian Brown Swiss Association announces that the annual

meeting will be held on January 2nd at Sherbrooke.

THE POTATO ASSOCIATION OF AMERICA

The fourth annual meeting of the Potato Association of America was held at Washington, D.C., on November 9th and 10th. A special effort had been made to make this meeting of an international character and letters had been sent to Canada urging that delegates should be sent. Some of the delegates present were Mr. W. T. Macoun, representing the Dominion Government; Dr. C. A. Zavitz, Messrs. P. W. Hodgetts and R. S. Duncan, Ontario; two delegates from Manitoba, including Mr. J. H. Evans, Deputy Minister of Agriculture; two from New Brunswick, including Hon. J. F. Tweeddale, Minister of Agriculture; Mr. W. S. Blair from Nova Scotia, and Mr. A. E. Dewar and another delegate from Prince Edward Island.

Special attention was given on the programme to the feeding value of potatoes

both for man and animals, drying of potatoes and other methods by which the potato could be utilized. The distribution of the potato crop and the car movement of potatoes was also discussed, as well as many questions in regard to their cultivation. While no actual plan of co-operation between Canada and the United States in regard to the handling of the potato crop resulted from this meeting, the information given by the Canadians present and that which they received is expected to result in a better understanding of the situation in both countries. The meeting was addressed by Mr. Hoover, Food Controller, who spoke of the food supply of the allies and how it must be maintained. Mr. Lou D. Sweet was re-elected President of the Association and Mr. W. T. Macoun, Dominion Horticulturist, was elected first vice-president.

NEW PUBLICATIONS

THE DOMINION DEPARTMENT OF AGRICULTURE

THE DOMINION EXPERIMENTAL FARMS

Reports in separate form. For the convenience of farmers and others interested in the subjects dealt with in the three-volume report of the Dominion Experimental Farms for the year ending March 31st, 1916, the reports of several divisions have been issued separately in pamphlet form. These reports which give full details of tests and experiments made, are those of the Dominion Husbandman, E. S. Archibald, B.A., B.S.A.; of the Dominion Cerealist, Chas. E. Saunders, B.A., Ph.D.; of the Dominion Horticulturist, W. T. Macoun; of the Supervisor of Illus-

trated Stations, John Fixter; of the Dominion Apiarist, F. W. L. Sladen, and of the Tobacco Husbandman, F. Charlan. These pamphlets include reports from the various experimental farms and stations in different parts of Canada.

Farm Egg and Poultry Accounts.—For the convenience of poultry raisers the Dominion Poultry Husbandman has worked out a sheet on which may be entered records of eggs laid and receipts and expenditures so classified as to show to what extent the flock is profitable. The sheets are for free distribution.

THE DIVISION OF ANIMAL HUSBANDRY

Finishing Lambs for the Block, by E. S. Archibald, B.A., B.S.A., Dominion Husbandman, Pamphlet No. 16, consists of

four pages, describing the profits to be derived from breeding and raising sheep. A table is given detailing the average profit over the cost of feeding lambs on the different experimental farms in Canada during the previous seven years. A section of the pamphlet is devoted to telling of feeds for winter lamb finishing and the cost of equipment.

THE ENTOMOLOGICAL BRANCH

"Regulations under the Destructive Insect and Pest Act, with instructions to importers and exporters of trees, plants and other nursery stock", is the title and description of Circular No. 10 of the Entomological Branch, of which Dr. C. Gordon Hewitt, Dominion Entomologist, is the author. It is a 12-page circular designed as a guide to importers and exporters of plants and other nursery stock, and, besides a full exposition of The Destructive Insect and Pest Act, contains a statement of the conditions under which shipments can be made to the United States.

The report of C. Gordon Hewitt, D.Sc., F.R.C.S., Dominion Entomologist, just published, covers the year ending March 31st, 1917. It makes a pamphlet of twenty-four pages and especially deals with administration of the Insect and Pest Act; the introduction of parasitic insects and the study of natural control; insects affecting grain and field crops, garden and green house, forests and shade trees, domestic and other animals, and household and public health. It also records in brief the work at the Entomological Field Laboratories throughout Canada and notes that a special circular on the control of flies and lice has been prepared for the Canadian Expeditionary Forces and distributed.

THE PROVINCIAL DEPARTMENTS OF AGRICULTURE

QUEBEC

The report of the Quebec Society for the Protection of Plants from Insects and Fungous Diseases for 1916-17 makes a book of 150 pages. It contains a number of illustrations and a series of descriptive and instructive papers by Dominion and Provincial experts.

ONTARIO

The forty-eighth annual report of the Fruit Growers' Association of Ontario for 1916 makes a blue book of ninety-two pages. It contains a full report of the annual meeting held in Toronto on February 8th and 9th. The papers given include "Varieties of Apple for Planting", "The Necessity of New Apple Orchards in Western Ontario", "Care of the Orchard

during the labour scarcity", "Fall Ploughing", "Does the Inspection and Sales Act Protect the Consumer", "Dusting as a Substitute for Spraying", "Dusting for Tender Fruits and Apples", "The Railway Situation", "Growing Strawberries in the Clarkson District", "Light Crops and their Causes", "Sweet Cherries", "The White Pine Blister Rust in Canada", and "The Marketing Situation in the Niagara District".

The thirty-eighth annual report of the Ontario Agricultural and Experimental Union for 1916 makes a blue book of ninety-two pages. It gives the results of co-operative experiments in agriculture by Dr. C. A. Zavitz, of co-operative experiments in apiculture by Morley Pettit, in weed eradication by J. E. Howitt, papers on what Ontario should do in regard to potato production, production of grain food stuffs, the home vegetable garden, production of animal food stuffs, dairy products in Ontario, the farmer's apple orchard, the management of soil fertility, cultivation of the soil, fertilizers and their use, all by college professors and other experts.

The Wintering of Bees in Ontario.—By Morley Pettit, Provincial Apiarist. This is an appropriately illustrated bulletin of twenty-four pages. It deals especially with the principles of successful wintering, methods of outdoor wintering, feeding for winter, cellar wintering and the spring feeding of bees.

Tuberculosis of Poultry, by Dan H. Jones, B.S.A., Professor of Bacteriology. We have here an eight-page illustrated bulletin written in response to many enquiries received at the Ontario Agricultural College regarding tubercular fowl. The cause, nature and control of the disease are dealt with.

Dairymen's Associations.—Verbatim reports of the proceedings at the annual meetings of the Eastern and Western Ontario Dairymen's Associations, with brief reports of the dairy school at the Ontario Agricultural College and the Eastern Dairy School at Kingston are given in this blue book of 142 pages.

Insects Attacking Fruit Trees, by Lawson Caesar, B.A., B.S.A., Provincial Entomologist, Bulletin 250. Professor Caesar in his introduction to this blue book of 55 pages says that he has not attempted to discuss all the insects that attack fruit trees in the province. This is true, but with a series of descriptive illustrations, he goes fully into the life-history, habits, methods and control of between fifty and sixty.

MANITOBA

The Gas Engine; Extension Bulletin No. 18, by A. C. Campbell, Gas Engine Specialist, Agricultural College. This forty-page bulletin goes very fully into its subject, describing the principles of the gas engine, its constructive parts, its uses and, in short, virtually all that it is necessary to know in its management, utility and care. Numerous drawings and half-tone illustrations add to the instructional value of the bulletin.

SASKATCHEWAN

Weed and Seed Commissioner's Report. The fifth annual report of the Weeds and Seed Branch of Saskatchewan makes a bulletin of 20 pages, covering the year ending April 30, 1917, and in it are recorded the activities of the half dozen field representatives of the province, the successes of Saskatchewan products at the International Soil Products Exposition, the results of the campaign against gophers and the doings of farm boys in camp and boys and girls in competition at fall fairs.

MISCELLANEOUS

Ayrshire Breeder's Annual Report. The annual report of the Canadian Ayrshire Breeders' Association for 1916-17 contains, besides a full account of the proceedings at the annual gathering in Montreal in February of this year, the records of performance between May 1st, 1916, and May 1st, 1917, the constitution and by-laws, rules of entry and a deal of other information of value to Ayrshire breeders besides upwards of 40 full-page photogravures. The official records of the breed revised up to May 1st, 1917, are published in the usual convenient pocket form with many illustrations of prize-winning and record-holding cows and details of the progeny of Ayrshire bulls that have registered in the Canadian Record of Performance test.

Vancouver, B.C., Exhibition. Bulletin No. 8. This pamphlet of sixty pages constitutes a directory of the officers and members of the Vancouver Exhibition Association and report of the annual meeting held at the end of October. It covers in detail the reports of the various departments of the exhibition held in 1917.

NOTES

Investigations made by experts from the United States Department of Agriculture have proven that chilled dry-packed poultry keep much better and stand shipment better than wet ice-packed poultry.

The Lambton County, Ontario, Co-operative Association has had six months of satisfactory business, and has promise of larger developments. They expect to enter hog selling on a grade basis in the near future.

A group of farmers in Oxford County, Ontario, providing milk for a powdered milk factory have formed themselves into the Burford District Milk Producers' Association, for the purpose of securing their full rights in dealing with the factory which has more than 300 patrons.

The Food Controller announced on Nov. 20th that the export to the United States of hay as well as of live stock may be licensed until further notice by endorsement by the Customs Collector at the point of exit and the usual Shippers' Export entry. Live poultry is included under the ruling regarding live stock.

The County Council of Peel has decided to give prizes of \$15 and \$10 at the provincial Winter Fair at Guelph November 20th to December 6th, for the best pen of three fat lambs (one ram and two ewes) pure bred, of any breed exhibited, owned and bred by farmer's sons of the county.

Last spring an arrangement was made with the banks of the province of Ontario whereby farmers could borrow up to \$200 each on approved security for the purchase of seed for production during 1917. This offer was open up to July 1st. The loans actually made under this arrangement aggregated only about \$114,000.

Mr. R. M. Tipper, District Representative for Ontario Co., related an instance at a school fair which is significant. While explaining to a small group of boys what to look for when judging corn in the ear, they were very soon surrounded by a number of men who had gathered to listen to what was being said. When Mr. Tipper had finished his explanation one of the men turned to him and said, "I plainly see there is something in this for us older men to learn as well as the boys."

Mr. J. H. Hare, formerly connected with the Poultry Division of the Live Stock Branch at Ottawa, has been appointed poultry commissioner for Alberta with offices at Calgary. The object of this appointment is to encourage the production of the higher grades of eggs and poultry, the conservation of food by the elimination of unnecessary loss in marketing, the stimulation of production by the payment for produce on a quality basis.

Mr. George E. Day, Professor of Animal Husbandry at the Ontario Agricultural College, has been appointed Secretary-Treasurer of the Dominion Shorthorn Breeders' Association. He will assume his new duties on January 1st, and devote his whole time to promoting the interest of Shorthorns in Canada. Professor Day has been at the head of the Animal Husbandry Department of the Ontario Agricultural College since 1893.

The District Representative of Lennox and Addington, Mr. G. B. Curran, has issued two four-page leaflets, one urging farmers to breed all the hogs they can and showing the profit to be derived and the good work that will be accomplished by doing so and the other on "Crate Fattening of Chickens". The latter is illustrated and supplies full and practical information. The leaflets are large size, eight by ten and a half inches.

As a means of securing a mailing list for literature to be sent out to prospective short course students, Mr. E. P. Bradt, District Representative, Dundas County, sent a circular letter to each school teacher in the district adjoining the centre of the short course. The letter asked for a list of the young men in the respective sections between the ages of fifteen and thirty years. A stamped, self-addressed envelope was enclosed with each letter.

The British Columbia Department of Agriculture will hold a provincial seed fair at Armstrong on December 6 and 7. Forty classes are provided, including grains, potatoes, corn, grasses and clovers, roots, and the seeds of other garden crops. At the conclusion of the fair the Department will issue a Seed Growers' Directory which will include the names of those seed growers who have supplied exhibits to the provincial and other seed fairs held in the province.

The Hon. T. C. Norris, Premier of Manitoba, issued to Manitoba farmers a strong appeal to raise as many hogs as possible during the next twelve months. The Premier fortifies his appeal with a statement of facts relative to the urgent demands of the armies and the certain high prices for pork produce. The announcement is made that the Manitoba Government is setting a good example by largely increasing the number of brood sows kept on the Provincial Government farms.

The Board of Trade of Hamilton has launched a movement to establish an International Live Stock Show in that city on similar lines to that held in Chicago annually. The Board recently gave a banquet, to which about a hundred of the most representative breeders of Ontario and representatives of the dairy interests were invited. Among those who attended and addressed the gathering were: Mr. J. A. Ruddick, Dominion Dairy Commissioner; Professor H. H. Dean of the Ontario Agricultural College; Mr. C. F. Bailey, Assistant Deputy Minister of Agriculture for Ontario; and Messrs. J. E. Brethour, John Gardhouse, D. C. Flatt, D. O. Bull and H. M. Robinson. Finally a committee was appointed to bring the matter before the live stock breeding associations at their annual meeting in February.

To secure recruits in the "Fork for Freedom" campaign, Mr. W. D. Jackson, District Representative for Carleton county, Ontario, induced the authorities and business people of the village of Carp to close their places of business on one day, in order to supply men for the harvest field. The only places kept open were the bank and the railway station and these with reduced staffs. On the evening previous to the day of closing business, a number of men met in the District Representative's office and after getting in touch with the farmers and finding out what help they most needed, the men, thirty-six in all, were allotted, and the following morning were distributed by the citizens who owned motor cars. The men included merchants, doctors, clerks, barbers, clergymen and retired farmers. Their services were given voluntarily.

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- Every Farmer His Own Entomologist—Reasons Why and Methods How a Farmer Should Study his own Insect Troubles, R. C. Treherne, Field Officer, Entomological Branch, Dominion Department of Agriculture, page 149.
- Grow Your Own Seed, by H. O. English, Chief Soil and Crop Instructor, page 151.
- Provide Your Own Floral Luxuries, Professor L. Stevenson, Superintendent, Dominion Experimental Station, Saanichton, B.C., page 153.
- The Canadian Countryman*, Toronto, Ont., November 24th, 1917.
- Fall Spraying of Fruit Trees—Saving Labour in the Farmer's Apple Orchard, L. Cæsar, page 1437.
- The Canadian Horticulturist and Beekeeper*, Toronto, November, 1917.
- Plant Breeding at the Horticultural Experiment Station, Vineland, E. F. Palmer, Director, page 286.
- Wintering Bees in Canada, C. Gordon Hewitt, B.Sc., Dominion Entomologist, page 291.
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- Canadian Poultry Review*, Hamilton, Ont., November, 1917.
- Poultry Breeding and Its Problems. Conducted by M. A. Jull, B.S.A., Poultry Manager and Lecturer, Macdonald College, Que., page 438.
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- Dominion Experiment Station Poultry Houses—Two Up-to-date Plans of Poultry Houses. Suitable for City or Country with Specifications and Instructions for Material and Building, by Mr. F. C. Elford, Dominion Poultry Husbandman, page 328.
- Farmer's Advocate and Home Journal*, Winnipeg, November 7th, 1917.
- Saving the Farm Machinery, by Professor J. MacGregor Smith, page 1535.
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- Farm and Dairy and Rural Home*, Toronto, November 22nd, 1917.
- Will We Finish Lambs for the Block? E. S. Archibald, Dominion Animal Husbandman, page 1251.
- November in the Poultry Yard, J. E. Bergey, Lecturer in Poultry Husbandry, Manitoba Agricultural College, page 1257.
- Farm and Ranch Review*, Calgary, Alta., November 5th, 1917.
- The Care of Ewes in Winter, Professor Thomas Shaw, page 972.
- Grain Growers' Guide*, Winnipeg, October 17th, 1917.
- Money When You Need It, E. A. Weir, B.S.A., page 1659.
- Oct. 24 Everyone a Food Controller, Dr. Jas. W. Robertson, Chairman, Central Advisory Council to the Food Controller, page 1699.
- The Nor-West Farmer*, Winnipeg, October 20th, 1917.
- Development of a Range Breed of Sheep—Mr. R. C. Harvey of Lethbridge District, has for some time been Crossing the Romney on the Rambouillet with the Idea of Producing a Better Range Sheep, Mr. J. McCaig of the Department of Agriculture, Edmonton, Discusses the New Breed, page 1101.
- The Saturday Press and Prairie Farm*, Saskatoon, November 10th, 1917.
- Live Stock-Breeding and Feeding Swine, G. E. Day, B.S.A., Professor of Animal Husbandry, Ont. Agr. College, Guelph, Ontario, page 15.

PART V

The International Institute of Agriculture

T. K. Doherty, LL.B., Commissioner

FOREIGN AGRICULTURAL INTELLIGENCE

The Institute is an international clearing house of agricultural information, trade and statistics, a State institution made up of fifty-five adhering countries.

The Canadian Commissioner furnishes the Institute the information needed concerning Canada, and in this connection solicits the active co-operation of all the readers of this section. It is particularly desired that duplicate copies of articles to be published in current periodicals or reports summarizing results of original research and investigations of universal interest, be sent to the Canadian office for communication to the Institute, to be available for publication in one or other of its three original monthly bulletins. Similarly, duplicate copies of all agricultural reports and writings, whether official or not, are requested for the Rome and Ottawa libraries.

The Canadian Commissioner makes available to Canadians information published by the Institute, for which purpose this section of THE AGRICULTURAL GAZETTE is published monthly. It contains articles and summaries from the original Institute publications. Owing to lack of space many articles are merely indicated, but may be secured upon application to the Commissioner.

Similarly, the Canadian office cheerfully collaborates with anyone desiring to investigate details of foreign agricultural methods and processes, legislation, organization or administration. The Institute library at Ottawa, which has been made as nearly as possible a reproduction of the great International Agricultural Library at the headquarters of the Institute, Rome, now contains about 35,000 books, reports and pamphlets, and a reference catalogue of some 165,000 cards, which includes a complete set of the cards of the U. S. library of Congress referring to agriculture. There are also some 350 periodicals, a great many of which are indexed by the H. W. Wilson Agricultural Index and are consequently easily available for the investigation of current questions. Anyone who may be unable to visit the library in person may write to the Commissioner who will, if desired, have appropriate bibliographies and memoranda prepared on any given subject.

All communications in regard to this section should be addressed to T. K. Doherty, International Institute Commissioner, Department of Agriculture, West Block, Ottawa.

	Per annum
International Review of Agricultural Economics	18 francs
International Review of the Science and Practice of Agriculture	18 "
International Crop Report and Agricultural Statistics	6 "
The Three Bulletins together	36 "

SCIENCE AND PRACTICE OF AGRICULTURE

GENERAL INFORMATION

517—Agriculture and Stock Breeding in Uruguay.—Report received from Dr. ENRIQUE JOSE ROVIRA, Uruguayan Delegate to the International Institute of Agriculture (extract from a Report by the engineer SOCRATES S. RODRIGUEZ). (8 pp. in Institute Bulletin).

519—Courses of Practical Agricultural Engineering in Italy and France.—I. TOSCANO, DARIO, Course of practical agricultural engineering in Sicily, in *Il Coltivatore*, Year 63, No. 12, pp. 394-395. Casale Monferrato, April 30, 1917. —II. School for drivers of agricultural machines, in *Le Progrès Agricole et Viticole*, Year 34, Vol. 67, No. 8, p. 189, Montpellier, February 25, 1917.

CROPS AND CULTIVATION

521—A Study of Climatic Conditions in Maryland (United States) as Related to the Growth of the Soy-Bean.—MCLEAN, FORMAN T., in *Physiological Researches*, Vol. 2, No. 4, pp. 129-208, 14 fig. Baltimore, February, 1917. (2 pp. in Institute Bulletin).

522—The Reaction Between Dilute Acids and the Phosphorus Compounds of the Soil.—RUSSELL, E. J., and PRESCOTT, J. A., in *The Journal of Agricultural Science*, Vol. VIII, Part 1, pp. 65-110 + 9 fig. Cambridge, 1916.

525—The Use of Dog's Tooth Grass (*Cynodon Dactylon*) for Binding Shifting Sands in Sicily.—BORZI, A., in *Bollettino di Studi ed Informazioni del R. Giardino Coloniale di Palermo*, Vol. III, pt. 3-4, pp. 101-116 + 2 plates. Palermo, 1916.

526—The Rapid Increase in the Output of American Potash.—Commerce Reports, No. 45, p. 728. Washington, D.C., February 23, 1917.

Greatly increased production of potash in the United States of America during 1916 is reported by the United States Geological Survey, which also expressed the belief that the output for 1917 will be much greater. The total production of potash salts and potash products in the United States in 1916 represented about 10,000 short tons of pure potash, with a net value at point of shipment of at least \$3,500,000 figured at the prevailing selling prices. This is ten times the value of the production reported for 1915, but the figures submitted by many of the producers represent only a start made towards the end of 1916.

The production of potash reported to date for 1916 may be summarized as follows:

Mineral sources: Natural salts or brines, 3,850 short tons; alunite and silicate rocks, including furnace dust recoveries, 1,900; total mineral, 5,750.

Organic sources: Kelp, 1,110; pearlash (mostly from hardwood ash), only 23 producers having reported to date out of a list of 70 establishments said to be producing, 220; miscellaneous industrial wastes, 1,750; total organic, 3,080.

Total output, 8,830 short tons.

The largest output has come from the Nebraska alkali lakes, but the natural saline deposits elsewhere are now just beginning to make important contributions. The figures for potash derived from alunite, of which there is only one important producer, are combined with those for available potash in cement-kiln, fluedust, greensand, and feldspar recoveries, in order not to disclose figures given in confidence. These do not include a considerable quantity of feldspar said to have been mined and prepared for possible use for the sake of the potash it contains. The production of potash from organic sources is about half that from mineral sources. The recovery of potash from pearlash is an old established industry.

528—The Addition of Tar to Calcium Cyanamide to Facilitate Spreading: Experiments made in Germany.—SCHMOEGER and LUCKS, in *Mitteilungen der deutschen Landwirtschafts-Gesellschaft*, No. 10, pp. 156-157, Berlin, March 10, 1917. (2 pp. in Institute Bulletin).

529—The Use of Lead for Stimulating Growth in Plants; Manuring Experiments in Germany.—STUTZER, A., in *Journal für Landwirtschaft*, Vol. 64, Pt. 1 and 2, pp. 1-8. Berlin, 1916.

532—The Formation and Disappearance of Saccharose in the Beet.—COLIN, H., in *Revue générale de Botanique*, Vol. XXVIII Parts 334, 335, 336, pp. 289-299, 322-328, 368-380; Vol. XXIX, Parts 337, 338, 339, 340, pp. 21-32, 56-64, 89-96, 111-127. Paris, 1916-1917. (2 pp. in Institute Bulletin).

- 538—**The Influence on Germination of the Hot Water Treatment of Cereal Seeds for Smut.**—LAKON, GEORG, in *Zeitschrift für Pflanzenkrankheiten*, Vol. 27, Pt. 1, pp. 18-25. Stuttgart, February 15, 1917 (2 pp. in Institute Bulletin).
- 535—**Pure Lines in Self-Fertile Plants Probably Unalterable by Selection.**—FRUWIRTH, C., in *The Journal of Heredity* Vol. VIII, No. 2, pp. 90-94, 1 fig. Washington, D.C., February, 1917. (2 pp. in Institute Bulletin).
- 540—**Experiments with Spring Cereals at the Eastern Oregon Dry-Farming Substation, Moro, Oregon.**—STEPHENS, DAVID E., in *U. S. Dept. of Agriculture, Bulletin* No. 498, 37 pp., 16 fig. Washington, February 19, 1917. (3 pp. in Institute Bulletin).
- 541—**Studies on Wheat in the Province of Rovigo, Italy.**—BERTONI, G., in *Il Coltivatore*, Year 63, No. 10, pp. 327-332, 3 fig. Casale Monferrato, April 10, 1917.
- 542—**Results of Trials in 1916 at the German Station for Potato Growing.**—VON ECKENBRECHER, E., in *Zeitschrift für Spiritusindustrie*, Year 1917, Supplementary No. pp. 1-57. Berlin, 1917. (3 pp. in Institute Bulletin).
- 543—**Sweet Potato Culture in the United States and in Sicily.**—I JOHNSON, T. C., and ROSA, J. T., Jr., Sweet Potato Culture, in *Virginia Truck Experiment Station, Bulletin* 19, pp. 387-415. Norfolk, Virginia, April 1, 1916.—II. BORZI, A., *The Batatas edulis* in Sicily, in *Bollettino di Studi ed Informazioni del R. Giardino Coloniale di Palermo*, Vol. III, Parts 3-4, pp. 118-127. Palermo, 1916. (3 pp. in Institute Bulletin).
- 544—**Influence of the Time of Cutting on the Yield of Lucerne, in Italy.**—MORETTINI, A., in *Le Stazioni Sperimentali Agrarie Italiane*, Vol. XLIX, Part II, pp. 541-562. Modena, 1916.
- The best time for cutting meadow-land is known to be at the beginning of the flowering period, but it is not always possible to effect it at this time and the majority of farmers prefer to postpone the time of cutting rather than to anticipate it.
- In order to ascertain whether this practice is a good one, the writer undertook to study the effect of anticipating or retarding the 1st and 2nd cuts upon the yields from subsequent cuts. His researches were carried out in 1914-1915 upon land adjoining the "R". Istituto Superiore agrario sperimentale" at Perugia, situated on a gentle slope and arranged in wide strips the test plant used being lucerne grown without irrigation.
- Summarising the results obtained during the 2 years' experiments it may be concluded that:
- 1) By advancing or postponing the cuts of lucerne on the normal time which corresponds to the beginning of flowering no increase in the total quantity of forage is obtained.
 - 2) The largest quantity of forage is obtained by making various cuts at the beginning of flowering and before the new buds appear at the base of the plants.
- In the localities where the experiments were made, the anticipation of the time of cutting lucerne has not increased the production of forage, contrary to the results obtained in other localities (Hohenheim, Proskau, Utah) and by other workers (Garola, Wolff, Foster and Merrill). The present writer considers that this is to be attributed to the fact that in the Province of Perugia, the amount of rainfall is insufficient to produce a beneficial effect after the time of the 1st cut.
- If it is impossible to make the cuts at the beginning of flowering, it will be less unfavourable to advance rather than to retard them; in the first case one only loses on the quantity of hay, whereas, in the second case, there is a diminution of the nutritive value also, and this decrease is greater the greater the delay.
- 554—**Experiments on the Pollination of Fruit Trees.**—CORRIE, LESLIE GORDON, in *The Journal of Heredity*, Vol. VII, No. 8, pp. 365-369, 1 fig. Washington, D.C., 1916. (2 pp. in Institute Bulletin)

LIVE STOCK AND BREEDING

- 560—**The Treatment of Overworked Horses and the Value of the Use of Glucose Serum in Intratracheal Injections.**—MASOTTO, LEOPOLDO, in *Il Nuovo Ercolani, Rivista di Medicina Veterinaria*, Year XXII, No. 7, pp. 109-113; No. 8, pp. 125-130. Turin, April 15 and 30, 1917.
- 563—**Tuberculosis of the Goat.**—MOUSSU, M., in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. III, No. 12, pp. 341-348, Paris, March 28, 1917.
- 564—**The Nutrients Required to Develop the Bovine Foetus.**—ECKLES, C. H., in *University of Missouri College of Agri-*

culture, *Agricultural Experiment Station, Research Bulletin* 26, pp. 1-36, 23 plates + 4 diagrams. Columbia, Missouri, November, 1916. (3 pp. in *Institute Bulletin*).

565—**New Feeding-Stuffs used in Germany during the War.**—KLING, M. (from the Agricultural Station of the Speyer district), in *Landwirtschaftliches Jahrbuch für Bayern*, Year 6, No. 11-12, pp. 488-513. Munich, 1916. (7 pp. in *Institute Bulletin*).

566—**Experimental Researches on the Nutritive Value of Maize; Raw, Sterilized and Decorticated.**—WEILL, E., and MOURIQUAND, G., in *Comptes Rendus des Séances de la Société de Biologie*, Vol. LXXX, No. 8, pp. 372-375. Paris, April 21, 1917.

567—**The Propagation of Wild-Duck Foods.**—MCATEE, W. L., in *United States Department of Agriculture, Bulletin* No. 465, 40 pp. 35 figs. Washington, Feb. 23, 1917. (2 pp. in *Institute Bulletin*).

Horse Breeding in the Argentine Republic.—MARTINOLI, G., in *International Review of the Science and Practice of Agriculture*, Year VIII, No. 6, pp. 819-825. Rome, June, 1917.

In the Argentine, as is well known, the horse owes its origin to a few animals abandoned by don Pedro de Mendoza two years after the foundation of Buenos-Aires (1537) and to those imported, a few years after, from Peru, Paraguay and Chili. The possibility of a type existing before Columbus, and descended directly from *Equus recidens*, though often discussed and recognized to be plausible, has not yet been sufficiently proved.

The horses imported originally by the Spaniards were of the Andalusian type; as a result of unchecked multiplication in the boundless pampa they gave rise to those innumerable semi-wild herds known as *cimarrones* or *baguales* which made such an impression upon the first writers who dealt with la Plata. So arose the *criolla* or creole race of primitive and hardy animals of which, for long years, man did not take the slightest care, allowing them to breed in conditions entirely natural and not always favourable. The result was that, as a result of its inadequate size and girth, the frequently excessive reduction of chest and lack of symmetry, the creole horse was obviously incapable of constituting the ideal type, necessary to the country when the general conditions of agriculture and stock-raising began to improve. There undoubtedly occurred, in various places, better built animals, of bigger size and more blood, which if properly selected,

might have given good results, but the Argentine breeders usually preferred to have recourse to crossing with breeding animals imported from Europe in their scheme for improving their live stock.

The importation of horses began to reach a certain importance towards the end of the 19th century. During the period 1900-1914 the number imported was 7130, the chief breeds being the Thoroughbred, Percheron, Clydesdale and Hackney.

In the Argentine it has too often happened that breeders, either out of their own conviction or for some particular interest, have followed completely opposite methods, some being immense enthusiasts for English thoroughbreds, others for the Hackney, the Anglo-Norman, the Yorkshire Coach, etc. The result is a continual changing of ideas which has inevitably led to the present state of affairs.

The Argentine possesses a considerable number of excellent English thoroughbreds for stud purposes: the following stallions may be quoted which have either been or are still being used: Flying Fox, Diamond Jubilee, Jardy, Ormonde, Pietermaritzburg, Cyllene, Polar Star. Nor is there a lack of types for crossing, such as Val d'Or. Unfortunately, this magnificent material is devoted entirely to the interests of the turf, very popular in the country. It would, however, have allowed of the formation of a magnificent collection of half-breeds adapted to various needs, whereas what actually exists is incomparably less important than what might and undoubtedly will be obtained eventually. In view of these antecedents, there is no room for astonishment if, notwithstanding the large number of horses existing in the country, it is difficult to obtain homogeneous lots of any importance. The admission is not a very satisfactory one to make and yet, in spite of everything, we have faith in the future of the Argentine in this respect and that for the following reasons:

In order to arouse the energy and latent capacity of breeders a recognised international market is required, one sure of paying good prices and capable of affording a clear index of requirements. After the present world conflagration this market is bound to be established, and there will then ensue a rapid transformation of this branch of animal production. In subsequent articles, treating of the production of cattle and sheep in the Argentine, we shall be able to prove that the existence of a definite and lucrative market has been the direct cause of improvements occurring in the breeding of both these classes of animals. Even with regard to horse-breeding, however, we can cite an example which affords abundant support of the opinion expressed above.

Hitherto the breeding of cart-horses has

not been influenced by any idea of an external market but has been obliged to respond to the ever-increasing demands of agriculture, industry and trade.

Requirements in the shape of ordinary saddle and light draught animals, army horses, etc., have always been relatively easy to satisfy owing to the large number of horses available relatively to the limited requirements along these lines. On the other hand, with regard to cart horses, it was a question of building up a type which absolutely did not exist and which must fulfil actual, positive requirements.

A start was thus made, first with Shires and Clydesdales, then with Percherons, and soon the number of pure-bred and half-bred animals was considerable. At the present time the majority of cart-horses, in the large towns of the Argentine are sound Shire and Clydesdale crosses, heavy animals showing the characteristics of these English breeds.

The turn of the Percherons has come relatively recently and already their success has surpassed that of the Clydesdales. The Percheron, in fact, is the real farm-horse which was wanted. It is the post-horse type which gives the best results: ample in stature and girth, hardy, strong, hardworking, it is adapted equally well both to the slow work of ploughing and to more rapid carting work, etc. If necessary, it goes well between the shafts of a country conveyance. It has been remarked, besides, that the offspring of crosses between these Percherons and good native mares of sufficient stature and muscle often gave excellent all-round animals, in great favour in the country and also for artillery.

At the exhibitions of the "Sociedad Rural Argentina" and also at provincial shows, one can often admire a really striking collection of these heavy animals. On the other hand, Boulonnais and Belgian horses have not yet found a favourable environment, and the same may be said of the Suffolk Punch.

Horse-breeding in the Argentine is characterized by the system of free pasturage. With the exception of valuable pedigree animals, reared in *cabanas*, and of horses employed in the large urban centres, all horses live continuously in the open, exposed to the inclemencies of the weather and the vagaries of the seasons. The horses of the first category are given various rations, almost always including: hay—maize or oats—bran, etc., but the overwhelming majority live exclusively on natural pastures or lucerne. Notwithstanding this free kind of life and feeding, the animals usually remain in good condition and work well, especially where the *pastos* (pastures) are rich and of the *tiernos* (tender) type or in the *alfalfares* (lucerne fields) zone. Speaking from our own experience, we may say that good Percheron crosses, employed throughout the year on

ploughing work, seeding, harvesting and carting grain, etc., and fed exclusively on the lucerne from *potreros* (enclosures) in which they are shut after work, keep in excellent condition and work hard and well.

In the *pampa* horses go unshod as stones or any other similar obstacles are completely absent, and the hoof wears down very slowly and does not split. The grooming leaves a fair amount to be desired, frequently the only attention given is to put the stallion with a certain number of mares at rutting time. An almost universal character among Argentine horses is their extreme docility once they have been broken in and trained to work.

Apart from the prizes offered at race-meetings and country exhibitions, and a certain number of purchases made by the Jockey Club for army purposes, there are no other forms of encouragement worth mentioning.

As stated above, in normal times prices have never been very good, and consequently many breeders, especially those interested in light-draught and saddle horses, have preferred to relinquish horses and devote themselves to fattening cattle.

569—Live Stock Production in the Eleven Far Western Range States, U.S.A.—BARNES, WILL C. and JARDINE, J. T., in *U. S. Dept. of Agriculture, Office of the Secretary, Report No. 110*, 100 pp. Washington, July 1, 1916. (4 pp. in Institute Bulletin).

570—Hereditary Transmission of the "Curly Wool" Character of Karakul Sheep in Crosses between the Karakul and Rambouillet Breeds; Research carried out in Austria.—ADAMETZ, LEOPOLD, in *Zeitschrift für induktive Abstammungs- und Vererbungslehre*, Vol. 17, Pt. 3, pp. 161-202. Leipzig, March, 1917.

Breeders of Karakul sheep of the Bokhara district (Central Asia), as well as most fur merchants of central Europe, consider the lock of Karakul lambs to be a specific product of their native habitat, outside which this character is not maintained. This was also Darwin's theory.

In order to clear up this point and to gain a better knowledge of the inheritance of the curl, crossings between Karakul sheep and Rambouillet sheep (whose lambs have straight wool) were carried out at the experimental farm of the High School for Agriculture at Gross-Enzersdorf (Austria). Unfortunately the experiments were unavoidably carried out under rather unfavourable conditions: as only 50 animals were available, only pure-bred Karakul rams were crossed with pure-bred Rambouillet ewes. In spite of their deficiencies, the experiments permitted the determination of the principal factors in the inheri-

tance of the Karakul curl. The results were compared with those obtained by other breeders from crosses between the Karakul and Zackel breeds.

RESULTS OF THE EXPERIMENTS.—1) The Karakul curl is a strictly hereditary character which is transmitted even if Karakul sheep are crossed with other races of which the lambs have wool which does not curl.

2) With regard to this character such crossings produce characteristic Mendelian segregations.

3) The capacity of Karakul sheep to form these typical locks is, therefore, a character which is never caused by the natural conditions of the Bakhara district, but is rather a phenomenon of domestication due to a mutation.

4) The capacity of forming Karakul locks is probably an incomplete dominant character in the Mendelian sense, as is the case with curls in certain human hair.

5) The incomplete dominance of the formation of curls is also seen by the fact that, already in the hybrids of F1, the fleece of the lambs varies greatly; some of the animals have no curls, others have curls like those of pure-bred Karakuls of the first quality, and there are all kinds of intermediate animals.

6) With regard to the hereditary force of curl formation, especially in the F1 generation the results vary in the different Karakul rams; this may be attributed to the individual strength of the animals.

7) The extent of curl formation in the lambs of the F1 generation depends also, all else being equal, on the second race without curls chosen for crossing. Breeds with mixed wool, especially of the Zackel breed give, very good quality curls in F1 generation; on the other hand, Merino sheep give bad quality curls. The absence of curls in the fleece of lambs derived from crossing Karakul and Rambouillet breeds is the result of atavistic crossings.

8) As the curls only appear in very young animals, their formation may be described as an incomplete and temporary dominant.

9) The varying behaviour of the hairs which form the curl at the different stages of the development of the fleece leads to the supposition that there is a close rela-

tionship between curly flat-lying hair on the one hand and curly, vertical hair and very wavy and slightly wavy hair on the other.

10) It is clear that the shape of the lower part of the follicle cannot be the cause of this varying behaviour of the hairs.

11) The mode of action of the mechanical forces during the formation of Karakul curls is not known.

12) The histological character of the different kinds of hair cannot, therefore, form a practical base in the choice of factors.

13) Unlike the less complete curls in human hair due to one factor only (in the white race, according to Davenport), or, at the most to 2 factors (in Hottentots with very curly hair, according to Fischer), the appearance of the Karakul curl, so far as can be judged by the results obtained, is probably caused by more than 2 factors.

14) If the manner in which the locks are transmitted within the pure-bred Karakul race itself is considered, it appears probably that a great many factors are concerned, all of which act in the same sense ("polymerism"), according to Nilsson-Ehle's theory.

15) The hypothesis that the capacity of forming curls in the Karakul race depends on a large number of factors acting in the same sense is corroborated by the fact that in the more complicated crossings made by the author ($F_2 \times F_2$ and $F_1 \times F_2$), there were often lambs whose fleece pointed to a sort of intermediary inheritance.

16) This explanation is contradicted by the fact that, even after repeated reciprocal crossings on the Karakul side, there still appear from time to time lambs without curls. This is probably a case of heterozygotes of a recessive type. The author considers improbable Davenport's hypothesis, that there exists a force which exercises a different activity, and, according to the circumstances, can cause these incompletely dominant characters to develop or else leave them in the latent state.

571—The Cost of Raising Leghorn Pullets.

—PHILIPS, A. G., in *Purdue University Bulletin*, Vol. IX, No. 196, 20 pp., 6 fig. Lafayette, Indiana, December, 1916. (2 pp. in Institute Bulletin).

FARM ENGINEERING

574—Ploughing with a Tractor.—RINGELMANN, MAX, in *Journal d'Agriculture pratique*, Vol. 29, No. 25, pp. 435-438, 4 fig.; Vol. 20, No. 6, pp. 103-106, 5 fig. Paris, Dec. 14, 1916, and March 22, 1917. (3 pp. in Institute Bulletin).

575—Tractor Plough Adjustments and

Hitches.—REED, C. O., in *Farm Implementation News*, Vol. XXXVIII, No. 9, pp. 26-27, 6 fig. Chicago, Illinois, March 1, 1917. (2 pp. in Institute Bulletin).

577—A Touring Car converted into a Tractor.—RINGELMANN, MAX, in *Bulletin de la Société d'Encouragement pour l'In-*

dustrie Nationale, Year 116, First Half-year, Vol. 127, No. 1, pp. 214-215, 1 fig. Paris, January-February, 1917.

- 578—The Jullien Tool-holder for One-armed Men.—RINGELMANN, MAX, in the *Bulletin de la Société d'Encouragement pour l'Industrie Nationale*, Year 116, 1st Half-year, Vol. 127, No. 1, pp. 16-25, 14 fig. Paris, January-February, 1917.

An apparatus for the purpose of enabling one-armed men to use the various agricultural implements such as spades, forks, etc.

The inventor has also designed for men having lost their fore-arm, a hammer-carrier with an anti-vibratory support which replaces the suppleness of the wrist and elbow and allows the one-armed man to hammer nails, etc. A rigid apparatus would tire the man very much and cause pain to the injured arm.

For planting out plants, M. Jullien has

devised a simple spring-clip which is fixed at the end of an ordinary apparatus for a one-armed man.

- 579—The Width of Wagon Tires Recommended for Loads of Varying Magnitude on Earth and Gravel Roads.—McCORMICK, B. E., in *United States Department of Agriculture, Circular No. 72*, 6 pp. Washington, February 12, 1917.

The recommendations in this circular are based on two factors: 1) the unit weight for width of tire commonly used for road rollers, and 2) the results secured from a large series of traction tests conducted by the Office of Public Roads and Rural Engineering, extending over several years and made in widely scattered localities throughout the United States.

The following are the tire widths recommended for wagons of different carrying capacities.

Type of wagon	Gross weight loaded	Width of tire
1 horse-wagon	2,000 lb	2 inches
Light 2-horse wagon	3,500 "	2 5 "
Medium 2-horse wagon	4,500 "	3 "
Standard 2-horse wagon	6,800 "	4 "
Heavy 2-horse wagon	7,500 "	5 "

- 582—Purifier for Rain Water.—GRANDERYE, L. M., in *La Vie agricole et rurale*

Year 7, No. 13, p. 227, 2 fig. Paris, March 31, 1917.

RURAL ECONOMICS

- 583—Methods and Cost of Growing Beef Cattle in the Corn Belt States.—COTTON, J. S., COOPER, MORTON O., WARD, W. F., and RAY, S. H., in *U. S. Department of Agriculture, Office of the Secretary, Report No. 111*, pp. 1-64. Washington, July 1, 1916.

This study represents Part III of an investigation into the production and consumption of meat organized by the Secretary of Agriculture. The data were collected from 595 farms representative of the agricultural situation in the Corn Belt, in the following states:—Illinois, Iowa, Missouri, South Dakota, Nebraska, Kansas, Minnesota and Indiana. Cattle-breeding is the most important branch of agriculture in this district, in Minnesota, 29% of the total farm area is pasture, and in Indiana 65%.

Table I summarises the data collected in each state concerning the size of the farms, their division into pasture, corn, small grain and hay, and their average value per acre.

The chief object of the investigation was to determine as accurately as possible the

cost of producing beef animals. With this end in view the records were divided into 6 groups based on the 6 distinct practices followed in general by the farmers.

GROUP I (Beef).—Farms where all the cows are kept strictly for beef (not including farms producing baby beef). On a number of these farms enough milk was taken from 2 or 3 cows of the best milkers to supply the family with milk and butter. In such instances the milk and butter credits have been ignored as it was found that the value of the extra labour in milking and caring for the calf, and of the extra grain given, usually offsets the value of these milk products.

GROUP II (Baby Beef).—Farms on which the breeding herds are maintained for the production of high-grade calves, which are fattened on the same farm and sold at from 12 to 18 months of age as baby beef.

GROUP III (Dual Purpose).—Farms on which all the cows are milked, and either cream or butter sold, the calves being weaned at birth and raised on skim milk.

GROUP IV (Mixed).—Farms on which the best cows are milked, their calves being weaned at birth and fed skim milk. The calves from the other cows are allowed to run

with their dams as in the beef group.

GROUP V (*Partially milked*).—Farms on which the calves are not weaned, but on which a part of the milk is drawn from the cow, the calf taking the remainder. There are a number of variations of this practice. One of these is to allow the calves to run with their dams during the day, but to keep them in a separate inclosure at night, the cows being

milked in the morning. Another common practice is to keep the calves separate and allow them to take the bulk of the milk twice daily, the remainder being taken for household and market purposes.

GROUP VI (*Double nursing*).—Farms where some of the cows are milked and their calves given to other cows, the latter raising two calves each.

TABLE I.—The average size and value of farms visited and the percentage of each in pasture, corn, small grain and hay, by States:

State	No of farms	Average size of farms	Area in pasture		Area in corn		Area in small grain		Area in hay		Value of land per acre
		acres	acres	%	acres	%	acres	%	acres	%	
Indiana (1914).	23	294	191	65	43	15	16	5	25	9	\$ 59
Illinois (1914)	21	294	158	54	60	20	32	11	38	13	129
Minnesota (1914-15)	60	357	104	29	85	24	66	18	51	14	125
Iowa (1914-15)	219	301	93	31	85	29	54	18	38	13	175
Missouri (1914-15)	78	356	179	50	53	15	36	10	71	20	82
South Dakota (1914).	14	511	180	35	146	29	90	18	75	15	97
Nebraska (1914-15)	66	380	116	31	105	28	74	19	53	14	132
Kansas (1914-15)	114	566	326	57	79	15	62	11	69	12	80

It may be seen that, in all these groups, animal production is based on the breeding herd, which remains almost constant. Table II shows the average importance of breeding cows in the 6 groups.

The cost of beef production was estimated by the following method: First of all the annual gross cost of maintaining each breeding cow and each bull was determined. The net profit was then estimated, including milk and manure, but excluding the calves. Next the percentage of baby beef in proportion to the number of cows and

bulls was calculated. The net cost of the cows and bulls was divided in proportion to these percentages. The average cost of the calves until weaning time on the different groups of farms was thus obtained. In determining the cost of production for one year the following factors were taken into consideration: food, labour, equipment, interest, risk, taxes, insurance and veterinary expenses. The costs thus obtained were compared with the inventory or sale values.

TABLE II. The size of the herds in each of the different groups:

Group	Number of farms	Cows		Bulls	
		Total no.	Average no.	Total no.	Average no.
I	230	7246	31 50	255 5	1 11
II	66	2281	34 56	81	1 23
III	110	1403	12 75	103 25	0 94
IV	102	2394	23 47	101	0 99
V	65	929	14 29	60 5	0 92
VI	22	381	17 32	20	0 91
General average	595	11634	24 55	621 25	1 04

Table III gives data concerning the average gross cost of keeping cows in the 6 different groups, and the net and relative cost, including milk and manure, but excluding calves. In a similar way the cost of bulls was determined, and the cost of calves up to one year by the method described above.

Table IV summarizes the results of these calculations as compared with the cost of production. In considering the records of the two years 1914-1915, it should be noted that the rather low average is due to the unsatisfactory results of the first year, caused by drought. The data obtained indicate that the keeping of cattle for beef purposes alone is adapted to the more ex-

tensive types of farming, while the keeping of cattle primarily for beef purposes, but where an income is also obtained from milk products, is better adapted to the more intensive types of farming. When estimating the profits obtained by raising calves on corn belt farms the following facts must be taken into consideration: 1) Good returns have been obtained for a large quantity of roughage which would otherwise have been wasted; 2) a home market has been provided for saleable crops; 3) on many farms a large acreage suitable to pasture only has been utilized; 4) profitable employment is provided for a season of the year when labour otherwise might be idle; 5) a return is obtained for capital

TABLE III. —Average gross cost of keeping a breeding cow in the 6 groups, and net cost:

Groups	Average cost per cow														Total net cost, including milk or butter and manure (excluding calves)
	Number of farms	Number of cows	Feed charges			Labour	Equipment	Interest	Risk	Taxes	Insurance (70% of the farms)	Veterinary	Total gross cost		
			Summer	Winter	Entire Year										
I	230	72 16 8	20	16 49	24 69	3 88	1 75	3 83	43	34	06	14	35 12	\$ 30 33	
II	66	2281 9	11	17 19	26 30	3 11	2 25	4 16	43	31	10	11	36 77	31 38	
III	110	1403 7	90	21 15	32 05	15 23	3 32	3 60	43	31	07	13	55 14	6 07	
IV	102	2394 7	43	20 30	27 73	9 03	2 37	3 90	43	32	07	10	43 95	19 23	
V	65	929 8	08	17 97	26 05	9 84	2 23	3 59	13	10	07	14	42 75	21 32	
VI	22	381 4	50	20 39	28 89	9 80	3 01	3 82	43	33	05	17	46 50	13 21	

invested in equipment which, in many instances, were it not utilized by live stock, would return nothing; 6) the farmer makes at least 6% interest on the money he has invested in the cattle business.

It should be noted that the greatest profits were yielded by Group VI, the double-nursing group. Although this system is adopted by a small number of breeders

only and only 22 records were procured, it gave the lowest cost of production both for calves at the time of weaning and for yearlings. This result is largely due to the milk credits, which were obtained without extra labour other than milking. It is also due to a larger percentage of calves produced by the cows, and to a larger proportion of the records being taken in the more favourable year of 1915.

TABLE IV. —Summary table showing for the 6 groups the various factors that make up the cost of producing a yearling.:

Item	Group I	Group II	Group III	Group IV	Group V	Group VI
Number of farms	230	66	110	102	65	22
Average number of cows per farm	31 50	34 56	12 75	23 47	14 29	17 32
Cost of maintaining the breeding herd						
Gross cost of maintaining a cow	\$35 12	\$36 77	\$55 14	\$43 95	\$42 75	\$46 50
Credits other than cow	1 79	5 39	19 07	24 72	21 43	33 26
Net cost of maintaining a cow	30 33	31 38	6 07	19 23	21 32	13 21
Net cost of maintaining a bull	12 27	53 26	37 51	16 79	34 14	40 53
Calf crop						
Percentage of cows raising calves to weaning time	84 9	90 7	83 9	87 5	90 1	92 1
Number of calves per bull	20 9	25 3	10 7	18 5	12 6	15 0
Cost of raising a calf to weaning time						
Cow charge	35 47	34 50	7 34	22 29	23 71	14 53
Bull charge	2 26	2 29	4 02	2 91	3 55	3 02
Feed, including pasture	0 01		9 35	4 48	0 02	0 26
Labour			2 56	1 11		0 01
Total cost at weaning time	37 71	36 79	23 27	30 79	27 08	17 82
Cost of raising a yearling						
Number of farms	190	67	99	96	57	22
Average number of calves per farm	24 43	30 20	10 57	18 46	11 16	14 23
Cost at weaning time	38 20	37 01	23 64	30 61	26 39	17 82
Winter-feed cost	12 32	35 02	9 93	12 01	12 21	10 21
Other charges	1 62	6 02	4 92	4 72	4 66	3 86
Gross cost	55 11	78 05	38 49	47 34	43 26	31 92
Credits (manure)	1 60	7 53	1 89	1 48	1 54	1 67
Net cost at 1 year	53 51	70 52	36 60	45 86	41 72	30 25

AGRICULTURAL INDUSTRIES

587—Changes in Fresh Beef During Cold Storage Above Freezing.—HAGLAND, R., MCBRYDE, CH. N., and POWICK, W. C., in *U. S. Department of Agriculture, Bulletin* 433 (Professional Paper), pp. 1-100. Washington, February 15, 1917. (3 pp. in Institute Bulletin).

588—Investigations into the Changes undergone by Eggs.—LINDET, in *Comptes rendus des Séances de l'Académie d'Agriculture de France*, Vol. III, No. 11, pp. 320-329. Paris, March 21, 1917. (2 pp. in Institute Bulletin).

PLANT DISEASES

594—Silver Nucleinate, a Substitute for Copper Sulphate in the Control of Vine Mildew.—VON DEGEN, A., in *Allgemeine Wein-Zeitung*, Year 34, No. 4, pp 25-28. Vienna, January 25, 1917.

597—On the Appearance of Puccinia glumarum (Yellow Rust) on Wheat in 1914 and 1916 in Germany.—MULLER, H., and MOLZ, E., (Communication from the Phytopathological Station at Halle a. S.), in *Fuhling's landwirtschaftliche Zeitung*, Year 66, Part 2, pp. 42-45. Stuttgart, January 15, 1917.

On account of the several attacks of the yellow rust of cereals on wheat in April and May, 1916, the writers sent a series of questions to the farmers in the phytopathological district of Halle, in order to determine the amount of damage caused by the rust. A similar series had already been distributed in 1914. The comparison of the two series of replies allows the writers to draw the following conclusions.

1) The appearance of the yellow rust is favoured by difficult growth of the wheat plant; in 1914 and 1916, growth had suffered from drought and very cold nights; these abnormal conditions had also favoured the germination of the uredospores.

2) The various varieties of winter wheat behave differently with regard to the rust; early varieties are more liable to the disease than late ones; Rivetts Bearded wheat was very resistant, and the variety "Crie-wener 104" was fairly resistant to rust; Squarehead wheats were very liable to it.

3) As regards the influence of manuring on the advent of the fungus, the question is not yet decided, especially for the nitrogen; it is certain that potash and phosphoric acid increase the resistance.

4) On heavy, deep and damp soils, less damage was caused than on shallow dry soils. Rust was never found on marshy soils, rich in mineral matter; whilst on soils poor in food stuffs (especially in the upper trias and the shelly limestones) it appears in mass; however, the writers are not in a position to generalize on these observations.

5) The best crop to precede wheat in the rotation was found to be sugar-beet: by mellowing the soil and improving the water content, it renders difficult the appearance of rust; cereals (specially oats) and sometimes lucerne, which require a large water supply and thus leave the soil already dry for the wheat, are less suitable for preceding wheat in the rotation.

6) Late sown wheat (end of October, beginning of November) were little subject to rust, but this cannot be generally applied.

7) The presence of meadows and water-

courses near the wheat fields have had a favourable influence on the appearance of rust.

600—Choanephora Cucurbitarum, a Phycomycete Parasitic on Cucurbita spp. in North Carolina, United States of America.—WOLF, FREDERIC A., in *Journal of Agricultural Research*, Vol. VIII, No. 9, pp. 319-327, pl. 85-87. Washington, D.C., February 20, 1917.

601—The Discovery of Teleutospore Sori of Cronartium Ribicola in the Interior of the Petioles of Ribes Roezli.—COLLEY, REGINALD H., in *Journal of Agriculture*, Vol. VIII, No. 9, pp. 329-333. Pl. 88, Washington, D.C., February 26, 1917.

604—Xylaria sp., the Cause of Root-Rot of the Apple in Virginia, United States of America.—FROMME, F. D., and THOMAS, H. E., in *Science*, New Series, Vol. XLV, No. 1152, p. 93. Lancaster, Pa., January, 1917.

An unusually destructive rot of the roots of apple trees is prevalent in the chief orchard sections of Virginia.

The symptoms of this disease have been known for some time, but the casual organism has not been determined.

Isolations made by the writers from diseased roots from a number of orchards in the State have yielded cultures of an imperfect fungus which appears to be the conidial form of a species of *Xylaria*. Inoculations made from pure cultures of these isolations into bark wounds of living apple trees in both damp chambers and in the field, have produced typical rotting of the bark and wood, and the introduced fungus has been obtained in pure culture from the margin of these infested portions.

Recently, perithecial stromata of *Xylaria polymorpha* (Pers.) Grev. have been found on roots of apple trees in various stages of typical root-rot attack and on the stumps of several deciduous trees in a small patch of woodland immediately adjoining the orchard in question. Cultures obtained from germinated ascospores of this fungus are being used for additional inoculations into apple roots.

Pending the result of these inoculations, it seems reasonably certain that more than one species of *Xylaria* are involved, since certain cultural distinctions exist between some of the isolations; these, however, may, be varietal rather than specific.

Apparently all varieties of the apple tree are susceptible and probably equally so.

AGRICULTURAL ECONOMICS

REGULATION OF THE FRUIT TRADE IN THE UNITED STATES.

For several years there has been in the United States a movement towards giving a more stable basis to the trade in fruit and vegetables so as to simplify to a great extent the relations between the producer and the buyer. Congress and the Assemblies of several States have taken the matter up and have sought to standardize the various products, if not for a whole State at least for the whole territory of a county, and to determine the shape, kind and dimensions of standard receptacles in which they are transported, so that a merchant knows exactly, having the guarantee of State inspection, the weight and quantity of fruit in any box or other package which he receives.

The importance of such measures has been similarly recognized in other countries, such as Canada and Australia, where also the fruit trade is regulated for the prevention of frauds at the expense of merchants or consumers and the simplification of transactions of purchase and sale.

The Californian law, which we will presently analyse, has considerable bearing not only on trade but also on the production of the State in general. The fixing of standards results in closing the foreign market to defective fruit; and growers therefore seek to improve the average quality of their products by choosing more carefully the varieties grown and by more scientific culture. Hence will result an increase in the horticultural wealth of the State.

No forecasts can be made as to the future development of these ideas in the many States of the Union, but the interest taken in the matter by the Federal Department of Agriculture allows the supposition that the example of California will be followed in other fruit-growing regions.

As now organized the production of perishable fruit and vegetables is a highly specialized agricultural industry. It is concentrated to a large extent in certain localities but it is conducted mainly on a small scale. Many of the regions especially devoted to fruit growing are situated far from markets. The industry in this specialized form came into existence when the growth of great cities necessitated the drawing of supplies of perishable food from larger areas than those comprising the farms in the cities' immediate neighbourhood, and when railroads made the utilization of this larger area possible. Areas for producing perishable food have now been extended into the extreme south and south-west. Of approximately 100 million tons of farm produce annually transported by train about 20

million tons are perishable. Public authorities, growers and merchants have already for many years studied, each from their own point of view, the problems inherent in the transport and sale of these perishable products.

a) Production.—Perishable fruits and vegetables are grown on a relatively small scale while the large aggregate demands of the great market centres have brought into existence dealers who handle such produce only in large lots. This fact and the recognition that many other problems of marketing these goods could be solved only by giving the producers some of the advantages of operations on a large scale led the Office of Markets and Rural Organization early in its work to advocate the co-operative organization of growers wherever conditions were favourable.

b) Preparation for Transport.—Perhaps the most serious losses in this trade are due to unseasonable picking of the fruits and vegetables or their improper handling after they are ready to be marketed. The products are handled roughly and their decay on the way to the market is thus facilitated. Careful grading of the harvested products is also essential if they are to secure a reasonable price. And not the least of the problems connected with this trade is that of the packing of these perishable goods and of selecting for them suitable receptacles, of the proper type and dimensions, which will give them adequate protection and an attractive appearance and will not be too costly.

Another step which can be taken with profit, when certain valuable products are to be transported under refrigeration over long distances, is the precooling of the packed fruits or vegetables by blasts of very cold air immediately before or just after they have been placed in the refrigerator cars. When perishable goods are stowed at their normal temperature in a refrigerator car the limited quantity of ice used does not chill them for several days. As a result they continue to ripen and in many cases begin to decay. Precooling obviously cannot be practiced by individual consigners on a small scale but it would be profitable in many cases to co-operative associations. It has proved particularly valuable to such of these associations as transport oranges from California across the continent.

The Office of Markets and Rural Organization finds that the producer may grow and even develop varieties of fruit or vegetables which will remain in good condition for long periods and stand better than the

usual varieties the delays and rough handling to which consignments may be subjected before they reach the consumer.

c) *Sale*.—The losses of perishable fruits and vegetables are not due solely to the mechanical operations of marketing—the handling at producing points, on cars and at the market. The intangible machinery of supply and demand causes the heaviest losses, bringing about violent fluctuations of price and also gluts. One fact emphasized by the investigations of the Office of Markets and Rural Organization is that even when there is a severe general glut of a commodity that quantity of it which is really first-class can often be sold profitably. Indication of an impending glut should therefore cause the producer to grade more strictly than ever. Gluts due to faulty distribution can be prevented when it is possible to keep consigners accurately informed as to supplies at marketing points. By surveys of producing areas and market centres the Office of Markets and Rural Organization has collected as many data as possible with regard to the supply of and demand for perishable produce. The normal consuming power of numerous markets for certain products has been ascertained and the data have been furnished to consigners with excellent results.

The advantages gained by standardized handling, grading and packing are strikingly shown by results obtained in the California citrus industry. Large losses accompanied almost every consignment to eastern markets in the earliest days of the industry, when practically all enterprise was individualistic. Many such losses were due to defective transport but an appreciable proportion to a failure properly to grade and pack the fruit. Co-operative organizations arose and undertook to a large extent the work of grading and packing. Losses were materially reduced but not to the point felt to be desirable. Investigations begun by the department shortly after 1900 disclosed the fact that careless picking was chiefly responsible for the remaining losses. Picking as well as grading and packing was then standardized throughout the industry, and losses were brought down to a very satisfactory minimum.

Recent investigations of the canteloupe industry by the Office of Markets and Rural Organizations showed the need of standardizing the handling of this product also. Losses were found to result on a failure carefully to select the melons for size and quality, on loose and unattractive packing and on the use of receptacles of haphazard sizes and shapes. Studies of the marketing of berries, peaches and other perishable products have further emphasized the general need for standardization.

In studying the problems of standardiza-

tion involved in the marketing of these perishable products the office has also gathered information as to the methods by which they are solved in various places. A bulletin as to this phase of marketing canteloupes has been issued, and bulletins on grading, packing and transporting other fruits and vegetables will follow. The office is also compiling a digest of State laws on standardization and on the weights and measures used in marketing.

It is believed that co-operative associations may be relied upon as important factors in bringing about a general adoption of standards for supplies and methods in marketing. Such organization can extend uniform practices over important provinces, and standardization on a larger scale can be effected through national organizations.

State and Federal legislation have to some extent applied the principles discovered and brought forward by the Office of Markets and Rural Organization, principles accepted alike by producers, dealers and consumers.

In 1912 Congress established a standard barrel to be used for apples in inter-State commerce. On 4 March, 1915, Congress passed an Act, which had force from 1 July, 1916, to fix a standard barrel for fruits, vegetables and other dry commodities; and on 31 August, 1916, a third Act, which has force from 1 November, 1917, fixed standards for "Climax" baskets for grapes and other fruits and vegetables, and fixed standards for baskets and other containers for small fruits, berries and vegetables.

Further on 12 March, 1915, an Act was passed in Delaware which amended chapter 21 of the State's revised code by provisions regulating the grading, packing, marking, transport and sale of apples. In California on 10 June, 1915, the legislature passed an Act "to establish a standard for the packing in the State of California of the kinds of fresh fruit specified in this Act, for sale or for transportation for sale, for interstate and foreign shipment, and to prevent deception in the packing; also to establish a system of inspection for the same". On 1 May, 1915, the Pennsylvania legislature passed an Act "regulating the sale, offering for sale or exposing for sale of vegetables, grapes and fruits; providing standard containers—baskets and trays—therefor; and imposing penalties".

a) *The Provisions of the Law*.—We will examine in more detail the Californian Act. It has been possible to observe its working for a year, and owing to the importance of fruit growing in California it has been the subject of much discussion.

The principal provisions of this law, passed on 10 June, 1915, and effective since 9 August, 1915, are as follows:

"There is hereby created and established a standard for the packing of fresh fruits,

for interstate and foreign shipment, of the kinds specified in this Act. Any box, basket, package or container of fresh fruit of the kinds specified in this Act, which shall be packed and offered for sale or for transportation for sale, shall be packed in accordance with the specifications herein made. All deciduous fruits of the kinds specified in this Act when packed shall be practically free from insects and fungous diseases. All fresh fruit of the kind specified in this Act which shall be sold in bulk, or loose in the box without packing, shall be exempt from the provisions of this Act.

"All cherries packed in boxes or packages shall contain fruit of practically uniform quality and maturity and one variety only, except that such boxes or packages may contain more than one variety if such fact be plainly stamped on the outside of the box or package with the words "Mixed Varieties" with letters one-half inch high. Each box or package (of cherries) shall be stamped on the outside with the minimum weight of contents and name of variety or varieties. Peaches, apricots, pears, plums and prunes shall be of practically uniform size, quality and maturity. When packed in crates, packages or containers, made up of two or more subcontainers having sloping sides for the purpose of ventilation of the fruit therein, the fruit shall not vary in size more than ten per cent, and no layer below the top layer shall contain a greater numerical count than the top layer. Each box, crate, package, container or subcontainer shall be stamped upon the outside with the minimum weight of its contents,... shall bear in plain letters the name of the variety contained therein, shall also be marked with the approximate number of peaches in the box which shall be within four peaches of the true count. Grapes packed for table use shall be of uniform quality and maturity and shall be well matured and show a (determined) sugar content ... Each crate or other package (of such grapes) and containers therein shall bear in plain figures the minimum weight of contents Berries shall be packed in uniform packages. Canteloupes shall be placed in standard crates.

"All boxes, crates, packages or containers shall bear upon them, in plain sight and plain letters on the outside, the name of the orchard, if any, and the name and post office address of the person, firm, company, corporation or organization who shall have first packed or authorized the packing of the same, also the name of the locality where the fruit is grown.

"In counties having a county horticultural commissioner it shall be his duty and the duty of his deputies, acting as inspectors, which office is hereby created, to enforce the provisions of this Act.... In a city and county or in counties having no

county horticultural commissioner or deputy, it shall be the duty of the county board of supervisors, upon petition filed with them, to appoint inspectors. Said petition shall be signed by at least twenty-five bona fide fruit growers residing in that county or city and county. Upon the petition of twenty-five resident freeholders who are fruit growers or shippers of fruit, the county horticultural commissioner or board of supervisors ... shall immediately remove said inspector for neglect of duty, malfeasance in office or general unfitness for office....

"Any person, firm, company, corporation or organization who shall knowingly pack, or cause to be packed, fruit of the kinds specified herein, in boxes, crates, packages, containers or sub-containers, to be offered for sale or transportation for sale, in wilful violation of this Act, shall be guilty of a misdemeanor."

b) The Application of the Law.—This law was originally drafted by a committee of interested growers and consigners in consultation with the State horticultural commissioner. It was amended many times but always by its friends.

Various counties had tried for some years to accomplish the desired regulation of packing by agreements with the growers, the transporting companies or both; but saving in the case of Eldorado and Placer counties their success was no more than partial or temporary. In Eldorado and Placer counties the voluntary associations of shippers and growers issued printed rules and diagrams which were posted in the orchard packing houses. The scheme worked exceedingly well where the shipping firms co-operated and refused any package below the standard, but otherwise the need of State authority for the inspectors was seen. The present law was largely based on experience of these regulations, and thus it emanated from the industry itself and public sentiment had been to some extent prepared for it.

The law has helped the grower because it has raised prices, largely as a result of the better standard reached by the fruit. It has helped the consumer and the general public because the improvement in quality has outweighed the increase in prices. It has benefited the transport companies who have received, with the better prices, more for their work, and have been able to show better profits to their stockholders.

The absolute impossibility of an examination by the inspectors of every packed box of fruit is apparent. The greatest good can be accomplished only when the fruit growers, packers and shippers themselves are in sympathy with the work and willing to co-operate with the inspectors by conforming to specifications. It was this co-operation of growers, packers and shippers with county horticultural com-

missioners, in San Joaquin, Fresno, Sacramento and other counties growing table grapes, which made possible last year an efficiently standardized packing of grapes resulting in splendid prices.

In the first year for which the law was in force about 20,000 carloads of fresh deciduous fruit were subject to its provisions. The experiment was entirely satisfactory, eastern buyers referring to the "marvellously scientific pack of California fruit". Thousands of crates of fruit were rejected, but the grade of the consignments was raised many per cent. with comparatively little injury to anyone and extremely low administrative costs. Many thousands of dollars were added to the industry.

c) *Suggested Modifications.*—The chief abuses which the law sought to remedy were the following: 1) Topping—a top layer of good berries conceals inferior berries; 2) Irregularity of size and of degree of maturity within one package; 3) Pest infection which in States having quarantine

laws results in the condemnation of whole consignments; 4) The mixing of varieties in one package; 5) Wrong and irregular marks; 6) Small content of sugar. In one year progress has been made towards preventing these abuses and the law has thus been shown to have great practical value.

At the Forty-Ninth State Fruit Grower's Convention, held at Napa in November 1916, some proposals were however made for completing and improving the regulation of the fruit trade. These were mainly: a) that all counties should by certain procedure be compelled to appoint inspectors b) that the different counties of the State should formulate uniform standards, thus introducing simplicity into the trade and allowing distant buyers to place orders at fixed prices for definite classes of goods; c) that packed fruit should be more precisely defined; d) that the law should apply to all consignments of fruit, including those intended for Californian markets; e) that some central authority should have complete control of the inspection of fruit.

CONTENTS OF THE INSTITUTE ECONOMIC BULLETIN

In addition to those already dealt with herein, the following is a list of the more important subjects treated in the June and July numbers of the International Review of Agricultural Economics. Persons in-

terested in any of the articles in this list may obtain the original Bulletin on application to the Institute Branch, so long as the supply for distribution is not exhausted:

<i>June Number.</i>	<i>Page</i>
The First Co-operative Cheese Factory in Spain	1-5
The Development of the Co-operative Movement in Italy	6-12
The Swiss Peasants' Union and Peasants' Secretariat in 1916	13-20
Insurance against Fire and the Development of Mutual Insurance in the United States	34-47
The State Land Bank for the Nobility in Russia in 1915	48-59
The Scottish Land Court in 1915	64-74
Interior Colonization and Progress of Agriculture in Korea	75-79
 <i>July Number.</i>	
The Central Co-operative Bank of Bulgaria	1-7
Institute of Credit and National Bank of Rural Funds in Italy in 1916	8-13
Central Co-operative Union of Flax Growers in Russia	14-21
The Land Bank of South Africa in 1916	28-32
Mutual Societies for Fire and Live Stock Insurance in Finland	33-40
Land Tenures in the Panjab in their Original Form and as Affected by British Rule	51-60
The Conditions of Rural Life in France	68-78

AGRICULTURAL STATISTICS

INSTITUTE CROP CABLE

Bumper world crops of corn, oats, potatoes, rice, sugar beets and tobacco for this year are shown by estimates compiled by the International Institute of Agriculture, made public November 24th. Wheat, rye, barley and flaxseed, however, have fallen below the five-year average of production from 1911 to 1915.

The production of wheat in seventeen countries, not including the Central Powers, will be 1,868,000,000 bushels, 86.6 per cent of the average. Corn raised will amount to 3,312,000,000 bushels,

which is 14.1 per cent greater than the average production for the last five years. Other crops are estimated as follows:

Rye, 147,000,000 bushels, 92.2 per cent; barley, 587,000,000 bushels, 96 per cent; oats, 2,682,000,000 bushels, 113.9 per cent; rice, 70,000,000 bushels, 115.5 per cent; flaxseed, 38,000,000 bushels, 69.8 per cent; potatoes, 719,000,000 bushels, 112.4 per cent; sugar beets, 10,000,000 short tons, 106.6 per cent; tobacco, 1,186,000,000 pounds, 112.5 per cent.

UNITED STATES NOVEMBER CROP REPORT

Preliminary estimates of a number of United States crops are given as follows in the November Crop Reporter. Compari-

sons are made with the final estimates for 1916 and the five years' average 1911-15.

CROPS		1917 Estimate	1916 Crop	1911-15 Average
Corn	bus.	3,191,083,000	2,583,241,000	2,754,164,000
Buckwheat	"	16,813,000	11,840,000	16,514,000
Potatoes	"	439,686,000	285,437,000	362,910,000
Sweet potatoes	"	84,727,000	70,955,000	60,257,000
Tobacco	lb.	1,185,478,000	1,150,622,000	983,723,000
Flaxseed	bus.	9,648,000	15,459,000	18,615,000
Pears	"	11,419,000	10,377,000	11,341,000
Apples	bbls.	177,733,000	202,245,000	215,572,000
Sugar beets	tons	7,621,000	6,228,000	5,839,000
Kafirs.	bus.	73,380,000	50,340,000	.

OCTOBER REPORT OF THE BRITISH BOARD OF AGRICULTURE

The reports furnished by the Crop Reporters of the Board on agricultural conditions in England and Wales indicate that September was upon the whole favourable to agriculture in the eastern half of the country; on the western side the weather was more unsettled, and harvest operations were delayed accordingly. Over the greater part of England the corn was secured, generally by the second or third week of the month, in satisfactory condition; but in the west a certain quantity still remained to be carted, and some in Wales had still to be cut, while much was harvested in damp condition.

The potato crop is now being lifted; in some districts much progress has been made, and in others little has been done, especially in the west, where the late harvest and rainy weather have rather

postponed this work. There is a good deal of disease in the south-west, but the position does not appear to be so bad as was feared; and in the rest of the country there is very little disease. Except in the north-west, the crop is everywhere above average, especially in the eastern counties, and the yield is expected to be 4 per cent above average.

Turnips and swedes are bad in the eastern and north-eastern counties, where there is a thin plant; but elsewhere they appear to be average, and even more in the southwest. On the whole the plant is expected to be 5 per cent below the average. Mangolds, on the other hand, are everywhere satisfactory, though they might have been improved by warmer weather, and the yield will probably be 3 per cent over average.

BROOMHALL'S FOREIGN CROP CABLE NOVEMBER 20th, 1917

United Kingdom.—Weather wet and cool. Movement is slow and foreign arrivals lighter. Native wheat and oats moving slowly and receipts command firm prices. The quality fair.

Balkan States.—Weather favoured seeding and from best information the acreage is large. Stocks and reserves are good and overland shipments have been important. There is no scarcity reported.

Hungary.—Neutral advices refer favourably to seeding and also stocks of grain.

Scandinavian Peninsula.—Weather cold and wet, supplies are light and great scarcity is reported. Foreign arrivals are increasing and it is expected that arrivals will continue on a limited scale.

Spain.—Weather favourable for seeding and a full acreage is reported. Supplies of both native and foreign wheat are liberal and normal conditions exist.

North Africa.—Weather and crop advices favourable. Acreage to wheat large. Shipments moderate of wheat and corn.

Russia.—Weather generally is unfavourable for agriculture and sowing disappointing. This is largely due to labour trouble

and the great unrest throughout the country and already supplies for natives are becoming apprehensive. The government has confiscated all grain supplies and great scarcity is noted in parts, as railway facilities are poor.

France.—Sowing is mostly finished, with the acreage moderate, owing to unfavourable weather and scarcity of labour and seed. Stocks everywhere are light of all grains and buyers are anxious. Large purchases have been made in Australia, which is slow of movement, and Argentine purchases liberal for January shipment. American wheat arriving slowly. Interior stocks small. Import needs important.

Italy.—Seeding is progressing, with weather favourable. Labour is scarce, and seed not plentiful and the recent cold weather was against agriculture. Estimates of the acreage are pessimistic. Supplies moving slowly. Foreign arrivals moderate.

Argentine.—Weather favourable in the north and centre and harvesting is progressing with yield and quality fully up to expectations. Weather is cool and parts wet, and this is not favourable. Arrivals in port show a better quality. Freights advancing with scarcity.

EXPORTS FROM THE UNION OF SOUTH AFRICA

YEARS	Coarse Wool	Sheepskins	Goatskins	Ostrich Feathers
	Lb.	Lbs.	Lbs.	Lbs.
1916	136 359,000	30,406,000	8,511,000	452,000
1915	169,961,000	37,326,000	8,302,000	949,000
1914	133,943,000	30,345,000	7,939,000	755,000
1913	176,921,000	32,187,000	9,102,000	1,033,000
1912	161,928,000			999,000
1911	132,169,000			827,000

LIVE STOCK STATISTICS

DENMARK

Numbers of live stock in Denmark in 1917 and 1914.

CLASSIFICATION	July 12, 1917	July 15, 1914
Horses	572,412	567,240
Cattle	2,458,158	2,462,862
Sheep	480,007	514,908
Pigs	1,650,623	2,496,706
Poultry	12,287,795	15,140,072

FRANCE

Numbers of live stock in France in 1917 and 1913.

CLASSIFICATION	July 1, 1917	Dec. 31, 1913
Horses	2,282,560	3,222,080
Asses	324,580	356,310
Mules	156,115	188,280
Cattle	12,443,304	14,787,710
Sheep	10,586,694	16,191,390
Pigs	4,200,280	7,036,850

THE AGRICULTURAL GAZETTE OF CANADA

INDEX TO VOLUME IV.

Acts Relating to Agriculture,—	
Cold Storage.....	712
Drainage in all its phases.....	989, 1097
Protection of Sheep, The.....	150
Stray Animals, The.....	318
Suppression and Control of Insects, Pests and Diseases Injurious to, or Des-	
tructive of, Vegetation, The.....	408
Weed Control.....	508
Advertising, Campaign of.....	788
Advertisements, Sample of, in Food Production Campaign.....	338
Agricultural College Live Stock, Sale of.....	1069
Colleges, Graduates of.....	586
N.S.; Macdonald College; Oka Agricultural Institute; Ste. Anne de la	
Pocatière; Ontario; Manitoba; University of Sask.; Alta. Agricultural	
Schools.....	
Course at Victoria High School.....	987
Development in New Ontario.....	307
Employment Bureau.....	782
Equipment for Schools.....	781
Equipment in Public Schools.....	699
P.E.I.; N.B.; Ont.; Sask.; Alta.; B.C.....	
Exhibit at Canada's National Exhibition, The Province's, Ontario.....	1053
Instruction Act, The.....	442, 650
Activities, Nova Scotia.....	589, 684
Act Appointment. An.....	680
Appropriations to the Provinces Under.....	651
The Work of the	647
at the Canadian National Exhibition.....	909
in Primary and Secondary Schools.....	507
Normal School, Fredericton.....	978
The University And.....	973
Junior Service League, Saskatchewan.....	698
Legislation.....	131, 318, 408
Federal.....	848
In Canada.....	150
Quebec.....	131
Recent, Alberta.....	566
British Columbia.....	569
Manitoba.....	487
Prince Edward Island.....	681
Nova Scotia.....	563
New Brunswick.....	682
Ontario.....	484
Saskatchewan.....	564
Returns, Saskatchewan.....	491
School and Demonstration Farm.....	307
Kemptville, Principal Appointed.....	783
Teaching in the Public and Separate Schools.....	707
Work at the Quebec Military Hospital.....	960
Agriculture, Acts Relating to.....	78, 318, 408, 508, 712, 989
Activities of the Department of Saskatchewan.....	597, 794, 972
Provincial Department of.....	885
Alberta College of.....	494
Appropriations for 1917-18, Federal.....	850
Committee on.....	132
Excursions to the College of.....	794

Agriculture in High Schools.....	149
How to Regenerate.....	961
New Deputy Minister of Saskatchewan ..	45
New Minister of, for Canada	935
New Minister of, in British Columbia.....	219
Ontario Administration of the Department of	43
Professor of Animal Husbandry for the College of, Alberta	313
Secretary for Appointed.....	393
The Demand for Trained Men in	152
Alfalfa in Canada.....	547
Wintering of.....	572
N.S.; Que.; Macdonald College; Sask.; B.C.	
Animal Husbandry, Professor of for the College of Agriculture, Alberta.	313
Anthrax.....	556
Apiaries, The Condition of.....	593
Apiculture Summer Course, O. A. C., 1917	685
Apple Dusting in Nova Scotia	254
Embargo, The.....	466
Orchard, Summer Pruning the Young ..	689
Scab in British Columbia, Controlling ..	210
Apples in Bristol, The Sale of Canadian.....	178
Originated in Nova Scotia, Three Varieties of	781
Appointments	753
Appreciation, An	945
Association of American Agricultural Colleges and Experimental Stations ..	1105
Associations and Societies	85, 154, 235, 324, 412, 516, 621, 814, 910, 994
Agricultural Relief of the Allies Committee	1108
A "Guide" Seed Fair	1108
Alberta Angus Breeders' Association	516
Alberta Cattle Breeders' Association	517, 621, 1109
Alberta Dairy Convention	85, 999
Alberta Hereford Breeders' Association	516
Alberta Horse Breeders' Association	516, 718
Alberta Sheep and Swine Breeders' Sale	1109
Alberta Sheep Breeders' Association	328, 1109
Alberta Winter Fair	998
Baby Beef Competition for Boys and Girls at the Alberta Winter Fair ..	999
Bee-Keepers' Association, Manitoba	85
Better Water Conference	718
Brandon Winter Fair Association	621
Breeders' Associations Record Meetings.....	90
British Columbia Bee-Keepers' Association	327
British Columbia Dairymen's Association	238
British Columbia Dairymen's Association, Extra Convention	719
British Columbia Fruit Growers' Association ..	154, 328, 412
British Columbia Goat Breeders' Association	412
British Columbia Poultry Association	154
British Columbia Stock Breeders' Association	328
British Columbia Institute Conferences	1110
British Columbia Veterinary Association	1000
British Empire Agricultural Relief of the Allies Fund ..	817, 1108
Calgary Industrial Exhibition Association	89
Canadian Ayrshire Breeders' Association	154, 239
Canadian Brown Swiss Association.....	85, 240, 324, 1110
Canadian Council of Agriculture	412
Canadian French Coach Horse Breeders' Association	239
Canadian Guernsey Breeders' Association	240
Canadian Hackney Horse Society.....	239
Canadian Hereford Breeders' Association	240
Canadian Jersey Cattle Club	240
Canadian Kennel Club.....	240
Canadian National Live Stock Records	241
Canadian Pony Society.....	239
Canadian Poultrymen's Belgian Relief Association	156
Canadian Record Association and Registrations	720
Canadian Seed Growers' Association	85
Canadian Seed Growers' Association, The Thirteenth Annual Meeting ..	815

Associations and Societies,

Canadian Sheep Breeders' Association...	240
Canadian Shire Horse Association...	239
Canadian Society for the Protection of Birds.	412
Canadian Standard Bred Horse Society.	239
Canadian Swine Breeders' Association.	240
Canadian Thoroughbred Horse Society	239
Canadian Trotting and Pacing Horse Association	239
Central Canada Veterinary Association...	85
Central Canada Veterinary Association	237
Clydesdale Horse Association of Canada	239
Dairy Association, Manitoba...	85
Dairymen's Association of Eastern Ontario	156
Dairymen's Association of Western Ontario	157
Dominion Cattle Breeders' Association	240
Dominion Grange	324
Dominion Shorthorn Breeders' Association	239
Dundas District Holstein Breeders' Club	516
Eastern Canada Live Stock Union	413
Entomological Society of Canada	996
Entomological Society of Ontario, The	911
Farmers' Week in Winnipeg	85
French-Canadian Horse and Cattle Breeders' Association	154
French Canadian Sheep and Swine Breeders' Association	154
General Stock Breeders' Association of the Province of Quebec	154
Hamilton Horticultural Society--Protection of Birds	995
Holstein-Friesian Association	154
Holstein-Friesian Association	240
Holstein Cows, Records of	154
Home Economics Society, Manitoba	85
Horticultural and Forestry Association, Manitoba	85
International Good Roads Congress.	324
International Soil-Products Exposition	994, 1055
Manitoba Agricultural Societies.	85
Manitoba Bee-Keepers' Association	326
Manitoba Dairy Association.	326
Manitoba Home Economics Societies.	327
Manitoba Horticultural and Forestry Association...	327
Manitoba Live Stock Associations	237
Maple Sugar and Syrup Association	85
Maple Sugar and Syrup Co-operative Association	236
Maritime Poultry Association	155
National Live Stock Week	239
New Brunswick Agricultural Societies	86
New Brunswick Agricultural Societies, United	996
New Brunswick Farmers' and Dairymen's Association	324
New Brunswick Potato Growers	155
New Brunswick Women's Institutes.	1106
Nova Scotia Dairymen's Convention	156
Nova Scotia Farmers' Association	324
Nova Scotia Fruit Growers' Association.	85, 235
Nova Scotia Fruit Growers' Convention..	155
Nova Scotia Poultry Association	235
Ontario Association of Fairs and Exhibitions.	85, 154, 237
Ontario Bee-Keepers' Association.....	86, 998
Ontario Berkshire Breeders' Association..	240
Ontario Corn Growers' Association.	325
Ontario Dairy Conventions.....	997
Ontario Experimental Union	159
Ontario Horse Breeders' Association...	240

Associations and Societies,

Ontario Horticultural Association	1106
Ontario Large Yorkshire Breeders' Society	240
Ontario Ploughmen's Association	85, 237
Ontario Poultrymen's Convention	718
Ontario Provincial Winter Fair	90, 997
Ontario Sheep Breeders' Association	240
Ontario Swine Breeders' Association	240
Ontario Vegetable Growers' Association	85, 89, 237
Ontario Winter Fair	326
Ottawa Horticultural Society—Demonstrations in Canning and Drying Fruits and Vegetables	817
Ottawa Vacant Lot Association	328, 621
Ottawa Winter Fair	159
Pomological and Fruit Growing Society of Quebec	87, 996
Potato Association of America, The	1110
Prince Edward Island Dairymen's Association	324, 717
Prince Edward Island Egg and Poultry Association	235
Quebec Bee-Keepers' Association	236
Quebec Homemakers' Club	88, 717
Quebec Stock Breeders' Association	1107
Sale of Alberta Provincial Sheep and Swine Breeders' Associations	910
Sales, Mock Auction	86
Sales, Regina and Saskatoon Sheep and Swine	85
Saskatchewan Breeders' Association	157
Saskatchewan Cattle and Horse Breeders' Association	85
Saskatchewan Dairymen's Convention	158, 1109
Saskatchewan Grain Growers' Association, District Conventions of the	998
Saskatchewan Live Stock Association	997, 1108
Saskatchewan Live Stock Board	158
Saskatchewan Stock Growers' Association	324
Saskatchewan Swine Breeders' Association	998
Saskatchewan Winter Fair	998
School Garden Association of Saskatchewan	516
Sheep and Swine Breeders' Association, Quebec	154
United Farmers of Alberta	998
of Ontario	1107
Wool Growers' Association	238
Grain Growers	910
Western Canada Fairs Association	238
Irrigation Association	814, 996
Live Stock Union	996
West Durham Horse Breeders' Club	412
Western Live Stock Union	85, 1107
Ontario Seed Growers' Association	86
Winnipeg Poultry Association	85
Women's Institutes of Ontario	88, 997
Automobile Tour, Farmers'	686
Backyard Garden Committees, Activities of, Toronto	321
Bacon Production Campaign, A	955
Bankers' Competition, The Canadian	766
Beef, Profitable Production	445
Bees, Condition of	596
Better Farming Special	1065
Trains, Saskatchewan	312, 491, 797
Bird House Fair, A	610
Houses, Ottawa School Boys Make	323
Boards of Trade and Agriculture	620
Book-Keeping, Farm	578
Que.; Macdonald College; Ont.; Sask.; Alta.; B.C.	
Boys' and Girls' Clubs	1079
and the Public School	981
Swine Contest	984
Brand Allotments Increasing	794
Bright, The Late John	361
Brine Tank Refrigerator Cars for Fruit Shipments, The Use of	110

Canadian	Maples for Our Soldiers' Graves in France	1042
	National Exhibition, Agricultural Instruction at the	909
	Wheats in Australia	546
Canning,	Efforts to Popularize, Home	778
	Fruits and Vegetables	753
	of Fruits and Vegetables, Home	768
	P.E.I.; N.S.; N.B.; Macdonald College; Ont.; Man.; Sask.; B.C.	
Cattle,	Hemorrhagic Septicemia of	764
	Mange (Psoroptic Scabies)	860
Cheese Commission,	The	754
Chemistry Exhibit of the	Agricultural College, N.S.	1049
Chrysanthemums,	Experiments with	9
Clover as a Feed,	The Value of Sweet	1070
Clubs, Boys' and Girls'	Calf	141
	Club	153
Club Contests, Boys' and Girls'	.....	476
	P.E.I.; N.S.; Macdonald College; Man.; Sask.; Alta.; B.C.	
Clubs of New Brunswick,	Home Efficiency	772
	Young Women's (Cercles de Jeunes Fermières)	783
College and Rural Leadership,	The	713
Competition for Girls,	Gardening and Canning	779
	Junior Farmers' Judging	908
	Observations made while Visits to Potato Plots in School Fair Were Paid	56
	School, in Crop Production, N.B.	268
Competitions,	Acre Profit	136
	Bacon Hog Breeding	301
	Canadian Bankers'	766
	Dairy	590
	Feeding Hogs for Profit	138
	Field Crop	142
	Live Stock Judging	687
	Standing Crop	303
	Summer-Fallow	697
Contagious Abortion	.....	463
Congress, Dry Farming,	Peoria, Illinois	794
Co-operative	Movement in Counties	784
	Association, Manitoulin	868
Course Agricultural at Victoria,	British Columbia, High School ..	987
	A Returned Soldiers' Agricultural ..	599
	for Rural Ministers, Short	811
	Short	101
	Short in Farm Engineering ..	1071
	Short, Suburban Gardening ..	216
	Summer, in Agriculture for Teachers ..	708
Courses	at Normal Schools, Agricultural Short ..	385
	for Live Stock and Field Crop Judges, Short ..	686
	in Agriculture, and Home Economics, Short ..	363
	P.E.I.; N.S.; Que.; Macdonald College; Ont.; Man.; Sask.; Alta.; B.C.	
	for Teachers, Summer	887
	N.S.; N.B.; Macdonald College; O.A.C.; Man.; Sask.; Alta.; B.C.	
	Four to Six Weeks'	373
	in Dairying, Short	383
	Domestic Science, Short	903
	Home Economics	380
	Household Science, Short	365
	Farm Engineering, Short, Two Months ..	382
Creamery,	The Government Establishes A ..	307
Creameries Amalgamation	.....	140
Crop	Production, Increased	268
	N.B.; N.S.; Ont.; Sask.; Alta.; B.C.	
	Report for the First Half of the Year, Manitoba ..	694
Crops and Cultivation	.....	626, 728
Crow, in Relation to Agriculture,	The American	446
Cyclamen Mite,	The	174
Dairy Cattle,	The Feeding of	30
	Macdonald College; Oka Agricultural Institute; O.A.C.; Alta.	

Dairy Cattle, The Feeding of, Sask.	218
Dairy Course for the Maritime Provinces.	366
Improvement Effort in North-Western Manitoba.	791
Staff Appointments	490
Dairies Regulation Act, The, British Columbia	498
Dairying Co-operation in	140
Improvement Effort in North-Western Manitoba	791
Short Courses in.	383
Demonstration Fields.	308, 782
Work, Equipment for	792
District Representative Activities.	594, 1066
Conference.	691
Features	883
and Other Appointments	683
Work in Nova Scotia	215
Distribution Service, The	562
Dominion Horticulturist Elected to Important Offices	1042
Dourine and Its Control	950
Drummond, The Late Daniel.	267
Employment Bureau, Agricultural.	782
Engineering, Two Months' Short Courses in Farm	382
Ensilage, O. P. V.	780
Entomological Records, Corrections In	357
European Ermine Moth (Yponomeuta) on Nursery Stock Imported into Canada,	
The Discovery of the	552
Exhibition, Agricultural Instruction at the Canadian National	909
Exhibit at the Regina.	795
Government Work	1032
Wool, Egg, Experimental Farms.	
of School Garden Products	709
Provincial Work	1049
N.S., Que., Ont.; Man.; Sask.	
Victoria Home Products.	74
Experimental Station for Northern Ontario, Kapuskasing, Ont	7
Quebec, Spirit Lake, Que.	8
Fairs, School	48
P.E.I.; N.S.; N.B.; Que.; Macdonald College.; Ont.; Man.; N. Sask.; S. Sask.;	
Alta.; B.C.	
Farm Book-Keeping	578
Que.; Macdonald College; Ont.; Sask.; Alta.; B.C.	
Department, N.S.	1050
Homes, Better	970
Labour.	387
N.S.; Que.; Ont.; Sask.; Alta.; B.C.	
Saskatchewan	493
Conference, Sask	390
Loans in the United States	991
Loans and Land Settlement	956
N.S.; N.B.; Que.; Sask.; B.C.	
Legislation, Provincial	545
Revenues, Short Cuts for Increased	790
Tractor, The Use of the	970
Fibre Production, Organization and Work	253
Field Husbandry, Professor of Appointed	497
Root and Vegetable Seed growing in the Maritime Provinces	122
British Columbia.	26
Flax Production, Organization and Work	253
Food Control Commission, The.	988
Food, Preservation of	751
Production Campaign Increased (with sample of advertisements).	337
Production, Increased.	231
Foods, The Comparative Sustenance Value of Certain Staple	309
Fruit Crops	782
Distribution.	763
Meetings.	18
Trees.	782
Fruits for Military Hospitals.	969

Game Fowl at the Experimental Farm.....	853
Garden and Farm, Increased Production	270
Gardening Campaign, Home.....	271
and Canning Competitions for Girls	779
Contests, Potato Growing and	84
Home and School.....	220, 316
P.E.I.; N.S.; N.B.; Que.; Ont.; Man.; S. Sask.; N. Sask.; Alta.; B.C.	
Vacant Lot.....	1083
Germination Testing	454
Glanders, The Suppression of	19
Gopher Day	313, 598
Week.....	487
Gophers, Control of Man.; Sask.; Alta.; B.C.	35
Destruction of, Saskatchewan	796
Further Particulars of	596
Government Exhibition Work: -	
The Wool Exhibit of the Live Stock Branch	1032
Egg Exhibit of Live Stock Branch	1035
Experimental Farms Exhibit	1036
Grain Rust, Special Researches on	259
Greater Production, an Appeal for, New Brunswick	269
Efforts for, British Columbia	273
Hares, Varying of the Prairie Provinces	260
Hebert, Louis	135
Hog Cholera	119
Production Campaign The Legislature Approves, Sask	1071
Production, Increase in—A Practical Proposition	967
Home Canning, Efforts to Popularize	778
Homesteaders as Farm Hands	252
Honour Roll, Dominion Department of Agriculture.	
27, 114, 185, 358, 459, 551, 673, 767, 1048	
House Keepers' League, The Quebec	783
Household Science in Brandon Normal School	147
in Normal Schools	400
N.B.; Ont.; Sask.; Alta.	
Household Science, Principal of School of, Resigns	906
Scholarships for	706
N.B.; Sask.; B.C.	
Teaching of	143
Que.; Macdonald College.	
Ichneumon Fly, Mesoleius Tenthredinis, a Parasitic Enemy of the Larch Sawfly,	
Nematus Erichsonii, Introduction into Canada of the	355
Incubation, Successful	288
N.S. Agricultural College; Macdonald College; O.A.C.; Manitoba Agricultural	
College; Sask.; Alta.	
Index to Periodical Literature	96, 164, 246, 332, 420, 524, 624, 726, 820, 913, 1003
Insect Attack, The Natural Immunity or Resistance of Plants to	855
Insects in Manitoba, Shade Tree and Forest	755
Insects, Pests and Diseases Injurious to, or Destructive of Vegetation, Federal and	
Provincial Acts for the Suppression and Control of	408
Inspector and Rural Science, the	608
International Soil Products Exhibition, At the	1055
Irrigation Results in 1916	124
Macdonald College; Ontario Horticultural Experimental Station, Vineland;	
Ontario Agricultural College.	
Lambs, Co-operative Marketing of	483
Land Drainage	186
P.E.I.; N.S.; N.B.; Que.; Ont.; B.C.	
Settlement Scheme After the War	130
Lawn Grass Mixtures	359
Legislation, Agricultural.....	131, 318, 408
Quebec	131
Federal	848
in Canada	150
Recent, Alberta	566
British Columbia	569
Manitoba	487

Legislation, Agricultural, Recent, New Brunswick	682
Nova Scotia	563
Ontario	484
Prince Edward Island	681
Saskatchewan	564
Provincial Farm Loan	545
Legislation for Weed Control	508
Lime, Experiments with	969
Live Stock Commissioner, The	1047
Commissioner Fallen in Action, Saskatchewan	1072
Industry, The	847
in Western Canada, Conservation of—The Carlot Policy	25
Distribution, Saskatchewan	972
Lunches, Rural School	611
Warm for Rural School Children	153
Macdonald, The Late Sir William	588
Macdonald Institute, Guelph, The Package Library	605
Man on the Land, To the	5
Manure, Conservation and Utilization of Farm	445
Manure, Conservation and Utilization of Farmyard	472
N.S. Agricultural College; Que.; Macdonald College; O.A.C.; Man.; Univer-	
sity of Sask.	
Manure on the Demonstration Farm, The Handling of	598
Maple Sugar and Syrup Industry, Season 1917	591
Market News Service, A	559
Marketing Fruit and Vegetables, Organization for	991
Hogs Co-operatively	1068
Marketing, Organization for	275
N.S.; Que.; Ont.; Sask.; Alta.	
Marketing, Organization for	251
Marketing of Wool, Co-operative	863
P.E.I.; N.S.; N.B.; Que.; Ont.; Man.; Sask.; Alta.; B.C.	
Marketing Poultry, Co-operative, Saskatchewan	972
McLean, Professor J. A.	46
Milk, Encouraging Production of High Standard	492
National Service Leagues in Nova Scotia	992
New Ontario, Agricultural Development in	307
Notes	94, 162, 244, 331, 417, 522, 623, 723, 819, 912, 1002, 1112
of Agricultural Affairs, Quebec	592
from British Columbia	399
Quebec	304, 395, 782
Noxious Weeds Act, Enforcement of, Saskatchewan	45
Nursery, A Provincial Schools	806
Nursery Stock for School Planting	802
N.S.; N.B.; Ont.; Man.; Sask.; Alta.; B.C.	
Nursery Stock Importations	46
Nurseries, Inspection of the	132
Orchard Demonstration in Dundas County	884
on the Prairie, Establishing an	102
Package Library, The	605
N.S.; Macdonald Institute; Man.	
Pasteurization at Low Temperature, Modern	614
of Milk, The	882
Pasture Crops in the Prairie Provinces	103
Brandon, Man.; Indian Head, Sask.; Rosthern, Sask.; Scott, Sask.; Lacombe,	
Alta.; Lethbridge, Alta.; in British Columbia.	
Pathologist Resigns, The Chief	1048
Pear Thrips, The Cost of Spraying in the Control of	13
Pepsin, Loss of Fat in the Whey when Using	660
People of Canada, To the	169
Performance, The Record of the	669
Periodical Literature, Index to	96, 164, 246, 332, 420, 524, 624, 726, 820, 913, 1003, 1114
Plant Breeding Station, A	309
Work at the Central Experimental Farm	656
Plot Breeding Station, A	309
Ploughing Matches and Demonstrations	695

Ploughing Match Demonstration	596
Pork Production Campaign, The	1047
Potato Crop of 1916, The	128
Crop, The Year's	1072
Growing and Gardening Contest	84
Industry in Ontario, Improving the	688
Seed, Experiments With	1039, 1056
Macdonald College; Ont.; Man.	
Potato Situation, Specialists Meet to Discuss	1061
Potatoes, The Cost of Growing	354
Mosaic Disease of	345
Prevention of Field and Storage Rot of, by Bordeaux Mixture	942
for Use as Seed Tubers, Northern and Southern Grown	128
Poultry Diseases	461
and Eggs Needed, More	266
Fattening and Co-operative Selling	394
Increased Production of	271
Keepers, A Plan for the Assistance and Encouragement of Urban	451
Marketing, Co-operative	283
Raisers, Relief for Belgian	910
Prize Awarding, Sliding Scale System of, in Manitoba	311
Production Survey, Cost of	398
Provincial Exhibition Work	1049
Publications Distributed in 1916	28
New	92, 161, 242, 329, 413, 517, 621, 721, 818, 911, 1000, 1110
Pullet, Economy of the	752
Quarantine, Infraction of	22
Regulations, Infraction of the	362
Rams and Boars, Statement with Respect to the Loan of to Farmers' Associations	452
Record of Performance, The	669
Reek, Mr., Returns to Ontario	309
Research in Canada, The Honourary Advisory Council for Scientific and Industrial	514
Resources Committee in Ontario, The Organization of	715
Organization of	396
Returned Soldiers, Land Settlement for	306
Rural School Consolidation	901
P.E.I.; N.S.; N.B.; Alta.	
Rural School Consolidation	976
Lunches	611
Science Activities	976
The Inspector and	608
Teachers and School Gardens	975
Social and Business Survey in Peel County, A.	964
Rye Winter	794
Sawfly in Manitoba and Saskatchewan, Further Observations upon the Habits of the Western Wheat Stem	176
School, Agricultural, and Demonstration Farm	307
Agricultural Instruction in Primary and Secondary	507
and Community Improvement	314
Fair and Rural Citizenship, The	709
Fair and Teachers' Convention	611
Fairs	48
P.E.I.; N.S.; N.B.; Que.; Macdonald College; Ont.; Man.; N. Sask.; S. Sask.; Alta.; B.C.	
Fairs, Examination at	976
for Rural Leadership	810
Gardening in British Columbia	711
1917	985
Garden, Production in Saskatchewan	272
Gardens and Greater Production	1073
N.S.; N.B.; Ont.; Man.; Sask.; Northern Sask.	
Gardens, Vacation Care of	610
Products, Exhibition of, Saskatchewan	709
Grounds, Beautifying	287
Ground Improvement	904
An Example of	983

School Inspector and Rural Science, The	499
N.S.; Ont.; Sask.	
Inspectors' Conference	74
Lunches in Rural Districts	978
Pupils, Distribution of Eggs to the	674
Que.; Macdonald College; Ont.; Man.; Alta.	
Schools for Teachers, Summer	601
Nursery, A Provincial	806
Royal Agricultural	960
Scientific and Industrial Research in Canada, The Advisory Council for	514
Screenings Available for Stock Feeding Elevator	907
for Poultry and Farm Animals, Elevator	851
in Mill Feeds	672
Seaweed as a Fertilizer	936
Secretary, Quebec Department of Agriculture	135
for Agriculture Appointed, New Brunswick	393
Seeding Down Roadsides and Waste Areas	308
Seed Exchange in Manitoba	44
for Germination, Testing	597
Grain Fairs and Dressed Poultry Shows	1054
Growing of Roots and Vegetables for, in the Province of Quebec	559
Investigation, 1916, Paper Packet	179
Production in Canada, Progress of Pure	232
Purchasing Commission, The	953
Weed, in Western Grain	360
Service without Sacrifice	1031
Sheep Breeders' Association, The Alberta	871
Alberta Provincial	871
The Ontario	868
Export Regulation of Canadian	950
Flocks, Demonstration	582
Macdonald College; Ont.; Sask.	
To Import Breeding	971
Protection of	150
Against Dogs	320
Sales of Pure Bred	882
Scab	263
Shipment, Inspection at Point of	17
Short Courses, Organizing for	1067
Skimming Stations	300
Soil Insects to Climatic Conditions, The Relation of	663
Surveys	467
Soldiers' Agricultural Course, A Returned	599
Spraying Experiments	193
N.S.; Que.; Ont.; B.C.	
in Nova Scotia in 1916, Some Results of	155
in the Control of the Pear Trips in British Columbia, The Cost of	13
Stallion Enrolment in Canada	974
Stallions, Premiums for	968
Student Enrolment, 1917-18	1104
Summer Schools for Teachers	601
P.E.I.; N.S.; N.B.; Que.; Ont.; Sask.; Alta.; B.C.	
Sussex and Studholm Wool Growers' Association, New Brunswick	866
Swine Raising Industry, Development of The	362
Teaching Value of Fairs, The (Quebec)	1050
Tobaccos and Their Possibilities, Canadian	10
Tractors, Work of the	593
Trade and Agriculture, Boards of	620
Trading, Co-operative	597
Trained Men in Agriculture, The Demand for	152
Transportation of Breeding and Feeding Cattle and Sheep, Free	859
Tuberculosis, Regulations Relating to	460
Tussock Caterpillars in Shade Trees, The False	1042
United States Live Stock Industries Commission	993
Vacant Lot Gardening. A Consideration of Method and Accomplishment in the Cities of the Dominion	1083

Variety Testing at the Dominion Experimental Farms, and what has been Accomplished by it	349
Vegetable Growing by Girl Guides	233
Production, Increased, Alberta	273
Seed Production	397
Varieties of Canadian Origin	171
Vegetables, Grains and Seeds, Official Weights of	717
Increased Production of	216
Varieties of, New	216
Veterinary Medical Association, The American	881
Science, Study of	874
N.S.; Que.; Ont.; Manitoba; Sask.; Alta.	
Study of	1058
Victoria Home Products, Exhibition	74
Watson, Late J. F.	551
Weed Seed in Western Grain	360
Weeds, Suppression of	441
Western Cedar Borer	946
Wheats, Canadian, in Australia	546
Wheat, Variation in	154
White Grub Investigation. A Brief Report of Progress	554
Wild Life Protection, Advisory Board on	322
Wilson, Mr. Tom	450
Winter Feeding of Lambs, The	1060
Women's Institutes, The	315
Institute Workers in Conference	486
Wool Clip, Eastern Storage for Western	265
Comparative Marketing in Ontario	322
Co-operative Marketing of	313
Co-operative Marketing of	863
P.E.I.; N.S.; N.B.; Que.; Ont.; Man.; Sask.; Alta.; B.C.	
Growers' Association, South Manitoulin	868
Southern Saskatchewan	870
Interior of British Columbia	872
Sale of	1071
Sales, Co-operative	23
Storage, at the Central Warehouse, Toronto	873
Zoologist, Consulting, Appointed	451

INDEX TO SOURCE

EDITORIAL PAGES.

Man on the Land, To The, by Honourable Martin Burrell, Minister of Agriculture	5
To the People of Canada, by Honourable Martin Burrell, Minister of Agriculture	169
New Minister of Agriculture, The	935
How We Can Best Serve, by W. J. Black	6
Canadian Wheats in Australia	546
Federal Agricultural Legislation	848
Federal Appropriations for Agriculture 1917-18	850
Homesteaders as Farm Hands	252
Increased Food Production Campaign	337
Live Stock Industry, The	847
Organization for Marketing	251
Preservation of Food, The	751
Provincial Farm Loan Legislation	545
Service Without Sacrifice	1031
Short Course, The	101
Suppression of Weeds	441
Work of the Agricultural Instruction Act, The	647

DOMINION DEPARTMENT OF AGRICULTURE

Agricultural Instruction Act Appointment, An.....	680
Agricultural Instruction Act, The.....	442, 650
Appropriations to the Provinces under the Agricultural Instruction Act.....	651
GOVERNMENT EXHIBITION WORK:	
The Wool Exhibit of the Live Stock Branch, by T. Reg. Arkell, B.S.A., B. Sc., Chief, Sheep and Goat Division.....	1032
The Egg Exhibit of the Live Stock Branch, by Ernest Rhoades, B.S.A.....	1035
The Experimental Farms Exhibit, by W. A. Lang, Acting Chief, Division of Extension and Publicity.....	1036

PART I.

DOMINION EXPERIMENTAL FARMS

Cost of Growing Potatoes, Experimental Station, Fredericton, N.B.	354
Crops in the Prairie Provinces, Pasture:	
Brandon, Man., by W. C. McKillican...	103
Indian Head, Sask., by T. J. Harrison...	106
Lacombe, Alta., by G. H. Hutton ..	108
Lethbridge, Alta., by W. H. Fairfield..	109
Rosthern, Sask., by Wm. A. Munro....	107
Scott, Sask., by R. E. Everest	108
Establishing an Orchard on the Prairie, by S. A. Bjarnason, B.S.A., Horticulturist, Experimental Station, Modern, Man ..	102
Experimental Station for Northern Ontario, Kapuskasing, Ont. .	7
Experimental Station for Northern Quebec, Spirit Lake, Que. .	8
Potatoes, Cost of Growing, Experimental Station, Fredericton, N.B. .	354
Watson, The late Mr. J. F.	551

DIVISION OF BOTANY:

Apple Dusting in Nova Scotia, by Paul A. Murphy, Officer in Charge, Dominion Plant Pathological Laboratory, Charlottetown, P.E.I.	254
Appreciation, An	945
Mosaic Disease of Potatoes, The, by Paul A. Murphy, Officer in Charge, Plant Pathological Laboratory, Charlottetown, P.E.I.	345
Potatoes, Prevention of Field and Storage Rot of, by Bordeaux Mixture, by Paul A. Murphy, Officer in Charge, Field Laboratory of Plant Pathology, Charlottetown, P.E.I.	942

THE DIVISION OF CHEMISTRY:

Seaweed as a Fertilizer by B. Leslie Elmslie, C.D.A., F.C.S., Supervisor, Inves- tigational Work with Fertilizers.....	936
---	-----

DIVISION OF ECONOMIC FIBRE PRODUCTION:

Organization and Work, by G. G. Bramhill, B.S.A., Chief	253
---	-----

DIVISION OF FIELD HUSBANDRY:

Beef Production, Profitable.	445
Manure, Conservation and Utilization of Farm, by W. L. Graham, B.S.A., Assistant Dominion Field Husbandman.	445

DIVISION OF FORAGE PLANTS:

Alfalfa in Canada, by M. O. Malte, Ph. D., Dominion Agrostologist.....	547
--	-----

DIVISION OF HORTICULTURE:

Canadian Maples for Our Soldiers' Graves in France. .	1042
Canning Fruits and Vegetables.....	753
Chrysanthemums, Experiments With, by W. T. Macoun, Dominion Horti- culturist	9
Dominion Horticulturist Elected to Important Offices	1042
Experiments with Potato Seed, by W. T. Macoun, Dominion Horticulturist..	1039
Fruits and Vegetables, Canning	753
Plant Breeding Work at the Central Experimental Farm, by A. J. Logsdaill, B.S.A., Assistant in Plant Breeding.....	656
Testing at the Dominion Experimental Farms and What Has Been Accom- plished By It, Variety, by W. T. Macoun, Dominion Horticulturist.....	349
Vegetable Varieties of Canadian Origin, by A. J. Logsdaill, B.S.A., Assistant in Plant Breeding.....	171

THE POULTRY DIVISION:

Fowl at the Experimental Farm, Game, by F. C. Elford, Dominion Poultryman,	853
Pullet, Economy of The.....	752

THE TOBACCO DIVISION:

Canadian Tobaccos and Their Possibilities, by F. Charlan, Chief of the Division,	10
--	----

DEPARTMENTAL BRANCHES.

THE DAIRY AND COLD STORAGE BRANCH:

Brine Tank Refrigerator Cars for Fruit Shipments, The Use of..	110
Cheese Commission, The.....	754
Pepsin, Loss of Fat in the Whey when Using, by Geo. H. Barr, Chief, Dairy Division..	660
Refrigerator Cars for Fruit Shipments, The Use of Brine Tank ..	110

THE ENTOMOLOGICAL BRANCH:

Cedar Borer, The Western, by R. N. Chrystal, Field Officer for Forest Insects, Entomological Branch; Department of Agriculture, Ottawa.	946
Consulting Zoologist Appointed.	451
Cost of Spraying in the Control of the Pear Thrips in British Columbia, The, by A. E. Cameron, M.A., D.Sc., and R. C. Treherne, B.S.A., Field Officers, Entomological Branch, Department of Agriculture, Ottawa, and E. W. White, B.S.A., Inspector, Department of Agriculture for British Columbia, Victoria, B. C.	13
Crow, The American, In Relation to Agriculture, by Norman Criddle, Dominion Entomological Laboratory, Treesbank, Man.	446
Cyclamen Mite, The, by Wm. A. Ross, Field Officer, Dominion Entomological Laboratory, Vineland, Ont.	174
Entomological Records, Corrections in	357
European Ermine Moth (<i>Yponomeuta</i>) on Nursery Stock Imported into Canada, The Discovery of the, by C. Gordon Hewitt, D.Sc., Dominion Entomologist.	552
Experiments in Nova Scotia in 1916, Some Results of Spraying, by G. E. Sanders, Field Officer in Charge, Dominion Entomological Laboratory, Annapolis Royal, N. S.	115
False Tussock Caterpillars on Shade Trees, The, by J. M. Swaine, in Charge of Forest Insect Investigations	1042
Fly, <i>Mesoleius Tenthredinis</i> , A Parasitic Enemy of the Larch Sawfly, <i>Nematus Erichsonii</i> , The Introduction into Canada of the Ichneumon, by Dr. C. Gordon Hewitt, Dominion Entomologist.	355
Grub Investigation, White—A Brief Report of Progress, by Arthur Gibson, Chief Assistant Entomologist in Charge of Field Crop Insect Investigations	554
Hares, Varying of the Prairie Provinces by Norman Criddle, Dominion Entomological Laboratory, Treesbank, Man	260
Ichneumon Fly, <i>Mesoleius Tenthredinis</i> , A Parasitic Enemy of the Larch Sawfly, <i>Nematus Erichsonii</i> , The Introduction into Canada of the. by C. Gordon Hewitt, D.Sc., Dominion Entomologist	355
Insect Attack, The Natural Immunity or Resistance of Plants to, by R. C. Treherne, Field Officer, Entomological Branch, Dominion Department of Agriculture	855
Insects in Manitoba, Shade Tree and Forest, by J. M. Swaine, Assistant Entomologist for Forest Insects.	755
Insects, The Relation of Soil to Climatic Conditions, by Alfred E. Cameron, M.A., D.Sc., Entomological Branch.	663
Moth, The Discovery of the European Ermine, (<i>Yponomeuta</i>) on Nursery Stock Imported into Canada, by C. Gordon Hewitt, D.Sc., Dominion Entomologist	552
Observations Upon the Habits of the Western Wheat Stem Sawfly in Manitoba and Saskatchewan, Further, by Norman Criddle, Entomological Laboratory, Treesbank, Man.	176
Plants to Insect Attack, The Natural Immunity or Resistance of, by R. C. Treherne, Field Officer, Entomological Branch, Department of Agriculture,	855
Sawfly in Manitoba and Saskatchewan, Further Observations Upon the Habits of the Western Wheat Stem, by Norman Criddle, Entomological Laboratory, Treesbank, Man.	176
Soil Insects to Climatic Conditions, The Relation of, by Alfred E. Cameron, M.A., D.Sc., Entomological Branch	663

Spraying Experiments in Nova Scotia in 1916, Some Results of, by G. E. Saunders, Field Officer in Charge, Dominion Entomological Laboratory, Annapolis Royal, N. S.	115
Spraying in the Control of the Pear Thrips in British Columbia, The Cost of, by A. E. Cameron, M.A., D.Sc., and R. C. Treherne, B.S.A., Field Officers, Entomological Branch, Department of Agriculture, Ottawa, and E. W. White, B.S.A., Inspector, Department of Agriculture for British Columbia, Victoria, B. C.	13
Varying Hares of the Prairie Provinces, by Norman Criddle, Dominion Entomological Laboratory, Treesbank, Man.	260
Western Cedar Borer, by R. N. Chrystal, Field Officer for Forest Insects, Entomological Branch, Department of Agriculture, Ottawa	946
Western Wheat Stem Sawfly in Manitoba and Saskatchewan, Further Observations Upon the Habits of the, by Norman Criddle, Entomological Laboratory, Treesbank, Man.	176
White Grub Investigation—A Brief Report of Progress, by Arthur Gibson, Chief Assistant Entomologist, in Charge of Field Crop Insect Investigations	554
Wilson, Mr. Tom.	450
Zoologist, Consulting, Appointed	451

THE FRUIT BRANCH:

Apple Embargo, The	466
Apples in Bristol, The Sale of Canadian, by D. Johnson, Fruit Commissioner	178
Distribution, Fruit, by F. H. Grindley, B.S.A., Assistant to the Commissioner	763
Fruit Meetings	18
Inspection at Point of Shipment, by K. B. Robinson	17

THE HEALTH OF ANIMALS BRANCH:

Abortion, Contagious, by F. Torrance, B.A., D.V.S., Veterinary Director General	463
Anthrax, by Chas. H. Higgins, Pathologist	556
Cattle, Hemorrhagic Septicemia of, by A. E. Moore, Chief Travelling Inspector	764
Cattle Mange (Psoroptic Scabies), by J. C. Hargrave, Chief Inspector for Alberta	860
Chief Pathologist Resigns, The	1048
Cholera, Hog, by George Hilton, V.S., Chief Veterinary Inspector	119
Contagious Abortion, by F. Torrance, B.A., D.V.S., Veterinary Director General	463
Diseases, Poultry, by A. B. Wickware, V.S., Assistant Pathologist in Charge of Poultry Investigations	461
Dourine and Its Control, by W. L. Hawke, D.V.S., Inspector in Charge, Veterinary Research Laboratory, Lethbridge, Alta.	950
Export Regulation of Canadian Sheep	950
Glanders, The Suppression of, by C. D. McGilvray, M.D.V., Chief Inspector for Manitoba	19
Hemorrhagic Septicemia of Cattle, by A. E. Moore, Chief Travelling Inspector	764
Hog Cholera, by George Hilton, V.S., Chief Veterinary Inspector	119
Poultry Diseases, by A. B. Wickware, V.S., Assistant Pathologist in Charge of Poultry Investigations	461
Quarantine, Infraction of	22
Quarantine Regulations, Infractions of the	362
Regulations Relating to Tuberculosis	460
Sheep Scab, by A. E. Moore, D.V.S., Chief Travelling Inspector	263

THE LIVE STOCK BRANCH:

Bacon Production Campaign, A	955
Bankers' Competition, The Canadian	766
Bright, The Late John	361
Carlot Policy, The Conservation of Live Stock in Western Canada, by P. E. Light, B.S.A., Intelligence Officer, Markets Division	25
Cattle and Sheep, Free Transportation of Breeding and Feeding, by H. S. Arkell, M.A., B.S.A., Acting Live Stock Commissioner	859
Co-operative Wool Sales, by T. Reg. Arkell, B.S.A., Chief of the Sheep Division	23
Development of the Swine Raising Industry, The	362
Drummond, The Late Daniel	267
Live Stock Commissioner, The	1047
Live Stock in Western Canada, Conservation of, The Carlot Policy, by P. E. Light, B.S.A., Intelligence Officer, Markets Division	25
Market News Service, A, by A. P. Westervelt, Chief, Markets Intelligence Division	559

Performance, The Record of, by C. S. Wood, Chief Inspector	669
Pork Production Campaign, The, Meeting of Western Province Representatives, 1047	
Poultry and Eggs Needed, More, by W. A. Brown, M.S., Chief of Poultry Division	266
Poultry Keepers, A Plan for the Assistance and Encouragement of Urban. . .	451
Production Campaign, A Bacon	955
Rams and Boars, Statement with Respect to the Loan of, To Farmers' Associations, by T. Reg. Arkell, B.S.A., B.Sc., in Charge of Sheep and Goat Division	452
Storage for Western Wool Clip, Eastern, by John Bright, Live Stock Commissioner	265
Swine Raising Industry, Development of the	362
Transportation of Breeding and Feeding Cattle and Sheep, Free, by H. S. Arkell, M.A., B.S.A., Acting Live Stock Commissioner	859
Wool Sales, Co-operative, by T. Reg. Arkell, B.S.A., Chief of the Sheep and Goat Division	23

THE SEED BRANCH:

Commission, The Seed Purchasing, by Geo. H. Clark, B.S.A., Seed Commissioner	953
Field Root and Vegetable Seed Growing in British Columbia, by Jas. R. Fryer, M.A., Seed Analyst, Calgary Laboratory	26
Field Root and Vegetable Seed Growing in the Maritime Provinces, by S. J. Moore, Maritime Representative	122
Germination Testing, by H. B. Sifton, B.A., Assistant Seed Analyst	454
Grass Mixtures, Lawn, by John R. Dynond, B.A., Seed Analyst	359
Paper Packet Seed Investigations, 1916, by E. D. Eddy, B.S.A., Chief Seed Inspector	179
Screenings in Mill Feeds, by J. R. Dymond, Seed Analyst	672
Seed Investigation, 1916, Paper Packet by E. D. Eddy, B.S.A., Chief Seed Inspector	179
Seed Purchasing Commission, The, by Geo. H. Clark, B.S.A., Seed Commissioner	953
Seed in Western Grain, Weed	360
Seed in the Province of Quebec, The Growing of Roots and Vegetables for, by J. A. Simard, B.S.A., District Seed Inspector for Quebec	559
Testing, Germination, by H. B. Sifton, B.A., Assistant Seed Analyst	454
Vegetable Seed Growing in the Maritime Provinces, Field Root and, by S. J. Moore, Maritime Representative	122
Vegetable Seed Growing in British Columbia, Field Root and, by Jas. R. Fryer, M.A., Seed Analyst, Calgary Laboratory	26
Weed Seed in Western Grain	360

THE PUBLICATIONS BRANCH:

Distribution Service, The	562
Publications Distributed in 1916	28

PART II.

PRINCE EDWARD ISLAND.

Agricultural Legislation, Recent	681
Agriculture, Short Courses in, by W. J. Reid, B.S.A., Director of Agricultural Instruction	363
Boys' and Girls' Club Contests, by J. E. McLarty, Rural Science Department, Charlottetown	476
Canning Fruits and Vegetables, Home, by Miss Hazel L. Sterns, Supervisor, Women's Institutes	768
Contests, Boys' and Girls' Clubs, by J. E. McLarty, Rural Science Department, Charlottetown	476
Co-operative Marketing of Wool, by W. J. Reid, B.S.A., Director of Agricultural Instruction	863
Drainage, Land, by W. R. Reek, B.S.A., Director of Agricultural Instruction	186
Ensilage, O. P. V., by W. J. Reid, B.S.A., Director of Agricultural Instruction	780
Household Science, Short Courses in, by Hazel Sterns, Supervisor, Women's Institutes	365
Legislation, Recent Agricultural	681
O. P. V. Ensilage, by W. J. Reid, B.S.A., Director of Agricultural Instruction	780
Short Courses in Agricultural, by W. J. Reid, B.S.A., Director of Agricultural Instruction	363

Short Courses in Household Science, by Miss Hazel Sterns, Supervisor, Women's Institutes	365
Stallion Enrolment in Canada	974
Wool, Co-operative Marketing of, by W. J. Reid, B.S.A., Director of Agricultural Instruction	863

NOVA SCOTIA.

Agricultural Instruction Activities, by J. G. Archibald, College of Agriculture, Truro	589, 684
Agricultural Legislation, Recent	563
Agriculture and Home Economics, Short Courses in, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	366
Alfalfa, The Wintering of, by John M. Trueman, B.S.A., Professor of Agriculture	572
Apples Originated in Nova Scotia, Three Varieties of, by P. J. Shaw, Provincial Horticulturist	781
Boys' and Girls' Club Contests, by L. A. DeWolfe, Director of Rural Science Schools	476
Canning Fruits and Vegetables, Home, by Miss Jennie A. Fraser, Superintendent, Womens' Institutes	768
By L. A. DeWolfe, Director, Rural Science Schools	769
Competitions, Dairy	590
Conservation and Utilization of Farmyard Manure, by John M. Trueman, B.S.A., Professor of Agriculture and Farm Superintendent	472
Contests, Boys' and Girls' Club, by L. A. DeWolfe, B.A., Director of Rural Science Schools	476
Crop Production, Increased by M. Cumming, B.A., B.S.A., Secretary for Agriculture	269
Dairy Course for the Maritime Provinces, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	366
District Representative Work, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	215
Drainage, Land, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	187
Experiments, Spraying, by W. H. Brittain, B.S.A., Provincial Entomologist	193
Farm Labour, by Arthur S. Barnstead, Secretary, Department of Industries and Immigration	387
Farm Loans and Land Settlement, by Arthur S. Barnstead, Secretary of Industries and Immigration	956
Graduates of Agricultural Colleges, by M. Cumming B.A., B.S.A., Principal, Agricultural College	586
Increased Crop Production, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	269
Incubation, Successful, by J. P. Landry, Professor of Poultry Husbandry	288
Instruction Activities, Agricultural, by J. G. Archibald, College of Agriculture, Truro	589
Labour, Farm, by Arthur S. Barnstead, Secretary, Department of Industries and Immigration	387
Land Drainage, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	187
Settlement, Farm Loans and, by Arthur S. Barnstead, Secretary of Industries and Immigration	956
Legislation, Recent Agricultural	563
Manure, Conservation and Utilization of Farm Yard, by John M. Trueman, B.S.A., Professor of Agriculture and Farm Superintendent	472
Marketing, Organization for, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	275
Production, Increased Crop, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	269
Provincial Exhibition Work, by M. Cumming, Secretary for Agriculture	1049
Provincial Chemistry Exhibit of the Agricultural College, by L. C. Harlow, B.Sc., B.S.A., Chemist	1049
Provincial, The Farm Department, by John M. Trueman, B.S.A., Professor of Agriculture and Farm Superintendent	1050
Representative Work, District, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	215
Short Courses in Agriculture and Home Economics, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	366
Soil Surveys, by L. C. Harlow, B.Sc., B.S.A., Chemist, Agricultural College	467
Spraying Experiments, by W. H. Brittain, B.S.A., Provincial Entomologist	193
Stallion Enrolment in Canada	974
Surveys, Soil, by L. C. Harlow, B.Sc., B.S.A., Chemist, Agricultural College	467
Veterinary Science, The Study of, by M. Cumming B.A., B.S.A., Principal of Agricultural College	874

Wool, Co-operative Marketing of:

Antigonish County Wool Growers' Association, by Hugh MacPherson, Secretary	865
Annapolis Valley Wool Growers' Association, by J. L. Pineo, Secretary	865
Guysboro County Wool Growers' Association, by A. B. Macdonald, Secretary	865
Inverness County Wool Growers' Association, by John R. McDonald, Secretary	866
Pictou County United Farmers, Limited, by W. Tamplin, Secretary	864
Richmond County Wool Growers' Association, by Rev. R. L. McDonald, Secretary	865

NEW BRUNSWICK

Agricultural Legislation, Recent	682
Agriculture, Secretary for, Appointed	393
Canning Fruits and Vegetables, Home, by Miss Hazel E. Winters, Supervisor, Women's Institutes	770
Clubs of New Brunswick, Home Efficiency, by Fletcher Peacock, Director of Manual Training	772
Crop Production, Increased—School Competition in Crop Production, by R. P. Steeves, M.A., Director of Elementary Agricultural Instruction	268
District Representatives and Other Appointments, by W. R. Reek, B.S.A., Secretary for Agriculture	683
Drainage, Land, by J. B. Daggett, Secretary for Agriculture	187
Farm Loans and Land Settlement, by W. R. Reek, B.S.A., Secretary for Agriculture	956
Home Efficiency Clubs of New Brunswick, by Fletcher Peacock, Director of Manual Training	772
Increased Crop Production—School Competition in Crop Production, by R. P. Steeves, M.A., Director of Elementary Agricultural Instruction	268
Land Settlement Scheme after the War, by J. B. Daggett, Secretary for Agriculture	130
Legislation, Recent Agricultural	682
Production, An Appeal for Greater, by R. P. Steeves, B.A., Director of Elementary Agricultural Instruction	269
Production, Increased Crop,—School Competition in Crop Production, by R. P. Steeves, M.A., Director of Elementary Agricultural Instruction	268
Wool, Co-operative Marketing of, The Sussex and Studholm Wool Growers' Association, by M. A. McLeod, Secretary	866

QUEBEC

Agriculture, The Committee on	132
Agriculture and Home Economics, Short Courses in, by F. N. Savoie, B.S.A., Secretary for Agriculture	367
Agriculture, How to Regenerate, by J. H. Lavoie, Chief of the Horticultural Division	961
Agriculture, Secretary of Department	135
Agricultural Affairs, Notes of	592
Agricultural Equipment for Schools, by Jean Charles Magnan, Superintendent of School Gardens	781
Agricultural Legislation	131
Agricultural Schools, The Royal	960
Agricultural Work at the Quebec Military Hospital, by A. Desilets, B.S.A., District Representative	960
Alfalfa, The Wintering of, by Leo Brown, Agricultural Instructor	572
Bacon Hog Breeding Competitions, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	301
Book-keeping Farm, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	578
Breeding Competitions, Bacon Hog, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	301
Clubs, Young Women's	783
Committee on Agriculture, The	132
Competitions, Bacon Hog Breeding, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	301
Competitions, Standing Crop, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	303
Conservation and Utilization of Farmyard Manure, by M. Gerard, Field Crops Division	473
Contests, Boys' and Girls' Club	482
Co-operative Marketing of Lambs, The	483
Co-operative Selling, Poultry Fattening and, by Rev. Brother Liguori of the Horticultural Division	394
Crop Competitions, Standing, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	303
Dairy Cattle, The Feeding of, by Br. M. Isidore, Professor of Animal Biology, Oka Institute	31

Drainage, Land, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture...	189
Eggs to the School Pupils, Distribution of, by Br. M. Liguori, of the Provincial Poultry Branch	674
Employment Bureau, Agricultural	782
Equipment for Schools, Agricultural, by Jean Charles Magnan, Superintendent of School Gardens	781
Experiments, Spraying, by J. H. Lavoie, Chief of the Horticultural Division	196
Experiments, Spraying, by Rev. Fr. J. P. Levasseur, Professor of Fruit Culture, Ste. Anne de la Pocatière	199
Farm Book-keeping, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	578
Farm Labour, by J. Antonio Grenier, Deputy Minister of Agriculture	387
Farm Loans and Land Settlement, by J. Antonio Grenier, Deputy Minister of Agriculture	957
Feeding of Dairy Cattle, The, by Br. M. Isidore, Professor of Animal Biology	31
Fruit Crops	782
Fruit Trees	782
Gardening Short Course, Suburban	216
Graduates of Agricultural Colleges, Ste. Anne de la Pocatière	587
Graduates of Agricultural Colleges, 1917, by Br. Jean de la Croix, Director	586
Hebert, Louis	135
Hog Breeding Competitions, Bacon, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	301
Inspection of Nurseries, The, by Georges Maheux, B.A., I.F., Entomologist	132
Labour, Farm, by J. Antonio Grenier, Deputy Minister of Agriculture	387
Lambs, The Co-operative Marketing of	483
Land Drainage, by F. N. Savoie, B.S.A., Secretary, Department of Agriculture	189
Land Settlement, Farm Loans and, by J. Antonio Grenier, Deputy Minister of Agriculture	957
League, The Quebec House Keepers'	783
Legislation, Agricultural	131
Manure, Conservation and Utilization of Farmyard, by M. Gerard, Field Crops Division	473
Maple Sugar and Syrup Industry, Season 1917, The, by F. N. Savoie, B.S.A., Secretary, Provincial Department of Agriculture	591
Marketing, Organization for, by E. Belanger, Journal of Agriculture	276
Military Hospital, Agricultural Work at the Quebec, by A. Desilets, B.S.A., District Representative	960
Notes	395, 782
Notes of Agricultural Affairs	592
Notes from Quebec, by E. Belanger, Journal d'Agriculture	304
Nurseries, The Inspection of, by Georges Maheux, B.A., I.F., Entomologist	132
Organization for Marketing, by E. Belanger, Journal d'Agriculture	276
Potato Crop of 1916, The, by H. Bois, School of Agriculture, Ste. Anne de la Pocatière	199
Poultry Fattening and Co-operative Selling, by Rev. Brother Liguori, of the Horticultural Division	394
Schools, Agricultural Equipment for, by Jean Charles Magnan, Superintendent of School Gardens	781
Schools, The Royal Agricultural	960
Secretary, Department of Agriculture	135
Short Courses in Agriculture and Home Economics, by F. N. Savoie, B.S.A., Secretary for Agriculture	367
Skimming Stations, by Alexandre Dion, Special Officer, Dairy Division, Department of Agriculture	300
Spray, Shall We Continue to, by Rev. Father Leopold, of La Trappe	199
Spraying Experiments, by J. H. Lavoie, Chief of Horticultural Division	196
Spraying Experiments, by Rev. Fr. J. P. Levasseur, Professor of Fruit Culture	199
Suburban Gardening, Short Course	216
Teaching Value of Fairs, The, by H. Nagant, Editor, Journal d'Agriculture	1058
Veterinary Science, The Study of, by F. T. Daubigny, M.V., Director, School of Comparative Medicine and Veterinary Science, Montreal	875
Veterinary Science, The Study of, by Chas. H. Higgins, B.A., B.V.S., Pathologist	1059
Women's Clubs, Young	783
MACDONALD COLLEGE:	
Agricultural and Home Economics, Short Courses in, from Information Supplied by Dr. F. C. Harrison, Principal	369
Alfalfa, The Wintering of, by James Murray, B.S.A., Professor of Cereals Husbandry	573

Book-keeping, Farm, by H. Barton, B.S.A., Professor of Animal Husbandry	579
Boys' and Girls' Club Contests, by J. Egbert McOuat, B.S.A., Demonstrator to Rural Schools	477
Canning Fruits and Vegetables, Home, by Miss Katharine A. Fisher, Head of School of Household Science	774
Conservation and Utilization of Farmyard Manure, by H. Barton, B.S.A., Professor of Animal Husbandry	473
Contests, Boys' and Girls' Club, by J. Egbert McOuat, B.S.A., Demonstrator to Rural Schools	477
Dairy Cattle, The Feeding of, by H. Barton, B.S.A., Professor of Animal Husbandry	30
Demonstration Sheep Flocks, by A. A. MacMillan, B.S.A., in Charge of Sheep Husbandry	582
Eggs, the Distribution of to School Pupils, by M. A. Jull, B.S.A., Manager, Poultry Department	675
Experiments with Potato Seed, by T. G. Bunting, B.S.A., Professor of Horticulture	1056
Farm Book-Keeping, by H. Barton, B.S.A., Professor of Animal Husbandry	579
Feeding of Dairy Cattle, The, by H. Barton, B.S.A., Professor of Animal Husbandry	30
Graduates of Agricultural Colleges	586
Incubation, Successful, by M. A. Jull, B.S.A., Lecturer and Manager, Poultry Department	291
Irrigation Results in 1916, by W. J. Tawse, B.S.A., Assistant in Horticulture	124
Manure, Conservation and Utilization of Farmyard, by H. Barton, B.S.A., Professor of Animal Husbandry	473
Sales of Pure Bred Sheep	882
Sheep Flocks, Demonstration, by A. A. MacMillan, B.S.A., in Charge of Sheep Husbandry	582
Sheep, Sales of Pure Bred	882
Short Courses in Agriculture and Home Economics, from Information Supplied by Dr. F. C. Harrison, Principal	369
Short Course, Suburban Gardening	216
Wool, The Co-operative Marketing of, by H. Barton, B.S.A., Professor of Animal Husbandry	866

ONTARIO.

Acre Profit Competitions, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	136
Administration of the Department of Agriculture	43
Advertising, Campaign of, by Justus Miller, Assistant Commissioner of Agriculture	788
Agricultural College Live Stock, Sale of	1069
Agricultural Development in New Ontario, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	307
Agricultural Exhibit at the Canadian National Exhibition, The Provinces, by C. F. Bailey, B.S.A., Assistant Deputy Minister	1053
Agricultural Legislation, Recent	484
Agricultural School and Demonstration Farm	307
Agriculture and Home Economics, Short Courses in—Ontario Agricultural College, by S. H. Gandier, B.S.A., Secretary	370
Agriculture, Ten Lessons in	1066
Apiaries, The Condition of	593
Apiculture, Summer Course, Ontario Agricultural College, 1917	685
Apple Orchard, Summer Pruning the Young, by E. F. Palmer, B.S.A., Director Horticultural Experiment Station	689
Automobile Tour, Farmers'	686
Bell, W. J., Principal Appointed for Kemptville Agricultural School	783
Better Farming Special	1065
Book-Keeping, Farm, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	579
Breeding Station, A Plant	309
Campaign, Home Gardening	271
Campaign of Advertising, by Justus Miller, Assistant Commissioner of Agriculture	788
Canning of Fruits and Vegetables, Home, by Geo. A. Putnam, B.S.A., Superintendent Institutes Branch	774
Competition for Girls, Gardening and Canning, by L. H. Newman, B.S.A., Secretary, Canadian Seed Growers' Association	779
Competitions, Acre Profit, by C. F. Bailey, B.S.A., Assistant Deputy Minister of	

Agriculture	136
Competitions, Feeding Hogs for Profit, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	138
Competitions, Live Stock Judging, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	687
Conference, District Representatives	691
Conference, Women's Institute Workers in	486
Conservation and Utilization of Farmyard Manure, by G. E. Day, B.S.A., Professor of Animal Husbandry	474
Co-operation Movement, The, Lambton County, by W. P. Macdonald, B.S.A., District Representative	784
Leeds County	785
In Other Counties	786
Co-operative Marketing of Wool:	
The Ontario Sheep Breeders' Association, by R. W. Wade, Secretary	868
Manitoulin Co-operative Association, by Wm. Hilliard, Manager, Kagawong. . .	868
South Manitoulin Wool Growers' Association, by G. H. Bond, Secretary . . .	868
Courses in Agriculture, Four to Six Weeks', by C. F. Bailey, B.S.A., Assistant Deputy Minister	373
Creamery, The Government Establishes	307
Dairy Cattle, The Feeding of, by A. Leitch, B.S.A., Farm Manager and Live Stock Investigator	33
Dairy Improvement Effort in North Western Manitoba, by W. R. Roberts, District Representative, Binscarth	791
Demonstration Farm, Agricultural School and	307
Demonstration Fields	308, 782
Demonstration Sheep Flocks, by R. W. Wade, B.S.A., Director Live Stock Branch .	584
Development in New Ontario, Agricultural, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	307
Distribution of Eggs to School Pupils, by R. S. Duncan, B.S.A., District Representative Supervisor	676
By J. B. Dandeno, Inspector of Elementary Agricultural Classes	677
District Representatives Activities	594, 1066
District Representatives Conference	691
District Representative Features	883
Drainage, Land, by J. R. Spry, B.S.A., in Charge of Drainage Department, Ontario Agricultural College	190
Eggs to School Pupils, The Distribution of, by R. S. Duncan, B.S.A., District Representative Supervisor	676
By J. B. Dandeno, Inspector of Elementary Agricultural Classes	677
Experiments, Spraying, by W. F. Kydd, Fruit Branch, Department of Agriculture	207
Experiments with Lime, by Robert Harcourt, B.S.A., Professor of Chemistry	969
Experiments with Potato Seed, by Dr. C. A. Zavitz, Professor of Field Husbandry	1056
Farm Labour, by W. A. Riddell, M.A., Ph.D., Superintendent, Trade and Labour, Branch, Department of Public Works, Toronto	388
Farm Revenues, Short Cuts for Increased	790
Feeding Hogs for Profit Competitions, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	138
Feeding of Dairy Cattle, The, by A. Leitch, B.S.A., Farm Manager and Live Stock Investigator	33
Fields, Demonstration	308
Foods, Comparative, Sustenance Value of Certain Staple Foods, by R. Harcourt, B.S.A., Professor of Chemistry, Ontario Agricultural College	309
Fruits for Military Hospitals	969
Fruit Trees	782
Garden and Farm Production, Increased	270
Gardening and Canning Competition for Girls, by L. H. Newman, B.S.A., Secretary, Canadian Seed Growers' Association	779
Gardening Campaign, Home	271
Graduates of Agricultural Colleges, 1917	587
Hog Production, Increase in—A Practical Proposition	967
Hogs for Profit Competitions, Feeding, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	138
Home Gardening Campaign	271
House-Keepers' League, The Quebec	783
Improving the Potato Industry in Ontario, by R. S. Duncan, B.S.A., District Representative Supervisor	688
Increased Crop Production	270
Increased Farm Revenues, Short Cuts for	790

Increased Production of Poultry	271
Incubation, Successful, by W. R. Graham, B.S.A., Professor of Poultry Husbandry ..	294
Irrigation Results in 1916, Ontario Horticultural Experiment Station, Vineland, by E. F. Palmer, B.S.A., Director	125
Irrigation Results in 1916, Ontario Agricultural College, by J. W. Crow, Professor of Horticulture	127
Judges, Short Courses for Live Stock and Field Crop	686
Judging Competitions, Live Stock, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	687
Kemptville Agricultural School, Principal Appointed for	783
Labour Farm, by W. A. Riddell, M.A., Ph.D., Superintendent Trade and Labour Branch, Department of Public Works, Toronto	388
Land Drainage, by J. R. Spry, B.S.A., in Charge of Drainage Department, Ontario Agricultural College	190
Land Settlement for Returned Soldiers	306
Legislation Recent Agricultural	484
Lime, Experiments With, by Robert Harcourt, B.S.A., Professor of Chemistry	969
Live Stock Judging Competitions, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	687
Manure, Conservation and Utilization of Farmyard, by G. E. Day, B.S.A., Professor of Animal Husbandry	474
Marketing Hogs Co-operatively, by Walter H. Smith, B.S.A., District Representa- tive, Leeds County	1068
Marketing, Organization for, by F. C. Hart, B.S.A., Director, Co-operation and Markets Branch	280
Military Hospitals, Fruits for	969
Milk, Pasteurization of the, by D. H. Jones, B.S.A., Professor of Bacteriology	882
Mr. Reek Returns to Ontario	309
New Ontario, Agricultural Development in, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture	307
Orchard Demonstration in Dundas County, by E. P. Bradt, B.S.A., District Repre- sentative	884
Pasteurization of Milk, The, by D. H. Jones, B.S.A., Professor of Bacteriology	882
Plant Breeding Station, A	309
Ploughing Competitions	1066
Potatoes, Northern vs. Southern, Grown for Use as Seed Tubers, Ontario Horti- cultural Experimental Station, by E. F. Palmer, B.S.A., Director	128
Potato Industry in Ontario, Improving the, by R. S. Duncan, B.S.A., District Representative, Supervisor	688
Potato Situation, Specialists Meet to Discuss, by Justus Miller, B.S.A., Assistant Commissioner of Agriculture	1061
Poultry Association Formed	1067
Poultry, Increased Production of	271
Premiums for Stallions, by R. W. Wade, Secretary, Stallion Enrolment Board ..	968
Principal Appointed for Kemptville Agricultural School	783
Production, Increase in Hog—A Practical Proposition	967
Production, Increased Garden and Farm	270
Production of Poultry, Increased	271
Production of Vegetables, Increased	216
Production, Vegetable Seed	397
Pruning the Young Apple Orchard, Summer, by E. F. Palmer, B.S.A., Director Horticultural Experimental Station	689
Resources Committee, Organization of, by Albert H. Abbott, Secretary	396
Roadsides and Waste Areas, Seeding Down	308
Rural Social and Business Survey in Peel County, A, by Justus Miller, B.S.A., Assistant Commissioner of Agriculture	964
School Fair Prizes, The Paying of	1066
School, Principal Appointed for Kemptville Agricultural School	783
Seeding Down Roadsides and Waste Areas	308
Sheep Flocks, Demonstration by R. W. Wade, B.S.A., Director, Live Stock Branch ..	584
Short Courses in Agriculture and Home Economics—Ontario Agricultural College, by S. H. Gandier, B.S.A., Secretary	370
Short Courses for Live Stock and Field Crop Judges	686
Short Courses in Stock Judging, by Geo. A. Putnam, B.S.A., Superintendent of Institutes	376
Short Course , Organizing for, by J. W. Stark, B.S.A., District Representative, Peel County	1067

Soil Surveys, by R. Harcourt, B.S.A., Professor of Chemistry, Ontario Agricultural College.	469
Soldiers, Land Settlement for Returned.	306
Spraying Experiments, by W. F. Kydd, Fruit Branch, Department of Agriculture	207
Stallions, Premiums for, by R. W. Wade, Secretary, Stallion Enrolment Board.	968
Stock Judging, Short Courses in, by Geo. A. Putnam, B.S.A., Superintendent of Institutes	376
Summer Course, O. A. C., 1917, Apiculture.	685
Survey in Peel County, A Rural, Social and Business, by Justus Miller, B.S.A., Assistant Commissioner of Agriculture	964
Surveys, Soil, by R. Harcourt, B.S.A., Professor of Chemistry, Ontario Agricultural College	469
Sustenance Value of Certain Staple Foods, The Comparative, by R. Harcourt, B.S.A., Professor of Chemistry, Ontario Agricultural College	309
Toronto, At the Central Warehouse	873
Tractors, Work of the, from an Official Statement by the Premier and Minister of Agriculture	593
Varieties of Vegetables, New, Vineland Horticultural Experiment Station.	216
Vegetable Seed Production, Horticultural Station, Vineland, Ont.	397
Vegetables, Increased Production of.	216
Vegetables New Varieties of, Vineland Horticultural Experimental Station	216
Veterinary College, The Ontario.	877
Veterinary Science, The Study of, by J. H. Reed, V.S., Professor, Veterinary Department, Ontario Agricultural College	876
Visits for Consultation	1067
Warehouse, Toronto, At the Central	873
Winter Feeding of Lambs, The, by J. P. Sackville, B.S.A., Lecturer, Animal Husbandry, O. A. C.	1060
Women's Institute Workers in Conference	486
Wool, Co-operative Marketing of the:	
Ontario Sheep Breeders' Association, by R. W. Wade, Secretary	868
Manitoulin Co-operative Association, by Wm. Hilliard, Manager, Kagawong	868
South Manitoulin Wool Growers' Association, by G. H. Bond, Secretary	868
Wool Storage Warehouse, Toronto	873

MANITOBA.

Agricultural Legislation, Recent.	487
Agriculture and Home Economics, Short Courses in, by S. T. Newton, B.S.A., Superintendent, Extension Service	377
Appointments, Dairy Staff	490
Bees, Condition of.	596
Boys' and Girls' Club Contests, by S. T. Newton, B.S.A., Director of Extension Service	479
Canning Fruits and Vegetables, Home, by S. T. Newton, B.S.A., Superintendent, Extension Service	775
Competitions, Summer Fallow, by S. T. Newton, B.S.A., Superintendent, Extension Service	697
Conservation and Utilization of Farmyard Manure, by G. W. Woods, B.S.A., Department of Animal Husbandry	475
Contests, Boys' and Girls' Club, by S. T. Newton, B.S.A., Director of Extension Service	479
Co-operative Marketing of Wool, The, by J. H. Evans, Acting Deputy Minister of Agriculture	869
Courses in Home Economics.	380
Crop Report for the First Half of the Year	694
Dairy Staff Appointments	490
Dairy Improvement Effort in North-Western Manitoba, by W. R. Roberts, District Representative, Binscarth.	791
Dairying, Short Courses in, by E. H. Farrell, Instructor in Butter-Making, Manitoba Agricultural College	383
Demonstration Ploughing Match.	596
Demonstration Work, Equipment for, by J. H. Kiteley, Field Husbandry Department, Manitoba Agricultural College.	792
Distribution of Eggs to School Pupils, The, by S. T. Newton, B.S.A., Superintendent of Extension Service.	678
Equipment for Demonstration Work, by J. H. Kiteley, Field Husbandry Department, Manitoba Agricultural College.	792

Engineering, Two Months' Short Course in Farm, by J. B. Reynolds, M.A., Manitoba Agricultural College . . .	382
Exchange Seed . . .	44
Experiments with Potato Seed, by Jas. A. Neilson, Dept. of Horticulture . . .	1057
Farm Homes, Better, by L. J. Smith, B.Sc., Professor, Agricultural Engineering . . .	970
Farm Tractor, The Use of the, by L. J. Smith, B.Sc., Department of Agricultural Engineering, Agricultural College . . .	970
Gopher Week, Further Particulars of . . .	596
Gopher Week . . .	487
Gophers, The Control of, by V. W. Jackson, Professor of Botany, Manitoba Agricultural College, and J. H. Kiteley, Field Representative . . .	35
Graduates of Agricultural College, 1917 . . .	587
Home Economics, Courses in . . .	380
Incubation, Successful, by M. C. Herner, B.S.A., Professor of Poultry Husbandry . . .	295
Legislation, Recent Agricultural . . .	487
Manure, Conservation and Utilization of Farmyard, by G. W. Wood, B.S.A., Department of Animal Husbandry . . .	475
Ploughing Match Demonstration . . .	596
Ploughing Matches and Demonstrations, by S. T. Newton, B.S.A., Superintendent, Extension Service, Department of Agriculture . . .	695
Prize Awarding, The Sliding System of, by S. T. Newton, B.S.A., Superintendent of Extension Service . . .	311
Seed Exchange in Manitoba . . .	44
Seed Grain Fairs and Dressed Poultry Shows . . .	1054
Sheep, To Import Breeding . . .	971
Short Courses in Agriculture and Home Economics, by S. T. Newton, B.S.A., Superintendent, Extension Service . . .	377
Short Course in Farm Engineering, Two Months', by J. B. Reynolds, M.A., President, Manitoba Agricultural College . . .	382
Short Courses in Farm Engineering . . .	1071
Short Courses in Dairying, by E. H. Farrell, Instructor in Butter-Making, Manitoba Agricultural College . . .	383
Sliding Scale System of Prize Awarding, The, by S. T. Newton, B.S.A., Superintendent, Extension Service . . .	311
Summer Fallow Competitions, by S. T. Newton, B.S.A., Superintendent Extension Service . . .	697
Stallion Enrolment in Canada . . .	974
Sweet Clover as a Feed, The Value of . . .	1070
Tractor, The Use of the Farm, by L. J. Smith, Department of Agricultural Engineering, Agricultural College . . .	970
Veterinary Science, The Study of, by C. D. McGilvray, M.D.V., Professor of Veterinary Science, Manitoba Agricultural College . . .	878
Wool, The Co-operative Marketing of, by J. H. Evans, Acting Deputy Minister of Agriculture . . .	869

SASKATCHEWAN

Act, Enforcement of the Noxious Weeds . . .	45
Activities of the Department of Agriculture . . .	794, 885, 972
Activities of the Department of Agriculture, by W. L. H. Stokes, Editor "The Public Service Monthly" . . .	597
Agricultural Legislation, Recent . . .	564
Agricultural Returns . . .	491
Agricultural Service League, Junior . . .	698
Agricultural Short Courses at Normal Schools, by W. W. Thomson, Director, Co-Operative Organization Branch . . .	385
Agriculture and Home Economics, Short Courses In, by S. E. Greenway, Director, Extension Department, College of Agriculture . . .	384
Agriculture, The New Deputy Minister of . . .	45
Alfalfa, The Wintering of, by L. E. Kirk, B.A., B.S.A., Instructor in Forage Crops, University of Saskatchewan . . .	573
Amalgamation, Creameries . . .	140
Better Farming Trains . . .	312, 491
Better Farming Trains, by W. W. Thomson, Director, Co-Operative Organization Branch . . .	797
Book-Keeping, Farm, by Edward Oliver, Acting Secretary, Statistics Branch. . .	580
Boys' and Girls' Club Contests, by S. E. Greenway, Director, Extension Department, College of Agriculture . . .	480

Brand Allotments Increasing	794
Canning of Fruits and Vegetables, Home, by Miss Abbie DeLury, Director, Home-makers' Club	777
Conference, Farm Labour	390
Congress, Dry-Farming, Peoria, Ill	794
Conservation and Utilization of Farmyard Manure, by W. J. Rutherford, B.S.A., Dean, College of Agriculture	475
Contests, Boys' and Girls' Club, by S. E. Greenway, Director, Extension Department, College of Agriculture	480
Control of Gophers, The, by F. H. Auld, Deputy Minister of Agriculture	37
Co-operative Marketing of Wool, the Saskatchewan, by W. W. Thomson, Director of Co-operative Organization	870
Southern Saskatchewan Wool Growers' Association, by C. S. Herring, Maple Creek, Saskatchewan, Secretary	870
Co-operative Poultry Marketing, by W. W. Thomson, B.S.A., Director, Co-operative Organization Branch	283
Creameries Amalgamation	140
Dairy Cattle, The Feeding of, by A. M. Shaw, B.S.A., Professor of Animal Husbandry, College of Agriculture, Saskatchewan	218
Demonstration Sheep Flocks, by W. H. J. Tisdale, B.S.A., Assistant Professor Animal Husbandry, University of Saskatchewan	584
Deputy Minister of Agriculture, The New	45
Dry Farming Congress, Peoria, Illinois	794
Enforcement of the Noxious Weeds Act	45
Excursions to the College of Agriculture	794
Exhibit at the Regina Exhibition	795
Farm Book-Keeping, by Edward Oliver, Acting Secretary, Statistics Branch	580
Farm Labour, by F. H. Auld, Deputy Minister of Agriculture, and Thos. M. Molloy, Secretary, Bureau of Labour	390
Farm Labour	493
Farm Labour Conference	390
Farm Loans and Land Settlement, by F. H. Auld, Deputy Minister of Agriculture	958
Feeding of Dairy Cattle, The, by A. M. Shaw, B.S.A., Professor of Animal Husbandry College of Agriculture	218
Gopher Day	313, 598
Gophers, The Control of, by F. H. Auld, Deputy Minister of Agriculture	37
Gophers, The Destruction of, by M. P. Tullis, Acting Weed and Seed Commissioner	796
Graduates of Agricultural Colleges, 1917	588
Hog Production Campaign, The Legislature Approves	1071
Incubation, Successful, by R. K. Baker, B.A., Professor Poultry Husbandry, College of Agriculture	296
International Soils Product Exhibition, At the	1055
Labour Conference, Farm	390
Labour, Farm, by F. H. Auld, Deputy Minister of Agriculture, and Thos. M. Molloy, Secretary, Bureau of Labour	390
Labour Farm	493
Land Settlement, Farm Loans and, by F. H. Auld, Deputy Minister of Agriculture	958
League, Junior Agricultural Service	698
Legislation, Recent Agricultural	564
Live Stock Commissioner Fallen in Action	1072
Manure, Conservation and Utilization of Farmyard, by W. J. Rutherford, B.S.A., Dean of the College of Agriculture	475
Marketing, Co-operative Poultry, by W. W. Thomson, B.S.A., Director, Co-operative Organization Branch	283
Marketing, Co-operative Wool	313
Milk, Encouraging Production of High Standard	492
Potato Crop, The Year's	1072
Poultry, Co-operative Marketing, by W. W. Thomson, B.S.A., Director, Co-operative Organization Branch	283
Production in the School Garden, by W. W. Thomson, B.S.A., Director, Co-operative Organization Branch	272
Production of High Standard Milk, Encouraging	492
Professor of Field Husbandry Appointed	497
Returns, Agricultural	491
Rye, Winter	794
School Garden, Production in The, by W. W. Thomson, B.S.A., Director Co-operative Organization Branch	272
Seed for Germination, Testing	597
Service League, Junior Agricultural	698

Sheep Flocks, Demonstration, by W. H. J. Tisdale, B.S.A., Assistant Professor of Animal Husbandry, University of Saskatchewan	584
Short Courses in Agriculture and Home Economics, by S. E. Greenway, Director Extension Department, College of Agriculture	384
Short Courses at Normal Schools, Agricultural, by W. W. Thomson, Director Co-operative Organization	385
Southern Saskatchewan Wool-Growers' Association, by C. S. Herringer, Maple Creek, Saskatchewan, Secretary	870
Stallion Enrolment in Canada	974
Testing Seed for Germination	597
Trading, Co-operative, by W. L. H. Stokes, Editor, "The Public Service Monthly"	597
Train, the Better Farming	312, 491
Trains, The Better Farming, by W. W. Thomson, Director, Co-operative Organization Branch	797
Veterinary Science, The Study of, by W. J. Rutherford, B.S.A., Dean of the Faculty of Agriculture, Saskatchewan University	880
Weeds Act, Noxious, Enforcement of the	45
Wool, Co-operative Marketing	313
Wool, Co-operative Marketing of, by W. W. Thomson, Director of Co-operative Organization	870
	Southern Saskatchewan Wool-Growers Association, by C. S. Herringer, Maple Creek, Sask., Secretary
	870
Wool, Sale of	1071

ALBERTA

Agricultural Legislation, Recent	566
Agriculture, College of, by Geo. Harcourt, B.S.A., University of Alberta, Edmonton	494
Agriculture and Home Economics, Short Courses In, by Alex. Galbraith, Superintendent of Fairs and Institutes	385
Agriculture, Professor of Animal Husbandry for the College of	313
Book-Keeping Farms, by E. S. Hopkins, Department of Agriculture, Edmonton	581
Contests, Boys' and Girls' Club, by E. S. Hopkins, Department of Agriculture	481
Control of Gophers, The, by J. McCaig, Editor of Publications	39
Course, A Returned Soldiers' Agricultural, by W. J. Elliott, B.S.A., Principal, School of Agriculture, Olds	599
Dairy Cattle, The Feeding of, by J. McCaig, Editor of Publications	34
Eggs to School Pupils, The Distribution of, by A. W. Foley, Poultry Superintendent	679
Farm Book-Keeping, by E. S. Hopkins, Department of Agriculture, Edmonton	581
Farm Labour, by H. A. Craig, B.S.A., Deputy Minister of Agriculture	391
Feeding of Dairy Cattle, The, by J. McCaig, Editor of Publications	34
Field Husbandry, Professor of, Appointed	497
Gophers, The Control of, by J. McCaig, Editor of Publications	39
Graduates of Agricultural Colleges, 1917	588
Incubation, Successful, by A. W. Foley, Poultry Superintendent, Department of Agriculture	298
Labour Farm, by H. A. Craig, B.S.A., Deputy Minister of Agriculture	391
Legislation, Recent Agricultural	566
Manure on the Demonstration Farms, The Handling of, by S. G. Carlyle, B.S.A., Superintendent, Demonstration Farms	598
Marketing, Organization For, Summary of Address Delivered by H. A. Craig, B.S.A., Deputy Minister of Agriculture, before the Conference of Rural Leadership	285
Professor of Animal Husbandry for the College of Agriculture	313
Production, Increased Vegetable, by Jas. C. Miller, B.Sc., Ph.D., Director of Technical Education	273
Short Courses in Agriculture and Home Economics, by Alex. Galbraith, Superintendent of Fairs and Institutes	385
Soldiers' Agricultural Course, A Returned, by W. J. Elliott, B.S.A., Principal, School of Agriculture, Olds	599
Stallion Enrolment in Canada	974
Vegetable Production, Increased, by Jas. C. Miller, B.Sc., Ph.D., Director of Technical Education	273
Veterinary Science, The Study of, by H. A. Craig, B.S.A., Deputy Minister of Agriculture	881

Wool, The Co-operative Marketing of:

Alberta Sheep-Breeders' Association, by E. L. Richardson, Secretary.....	871
Alberta Provincial Sheep-Breeders' Association, by W. J. Stark, Secretary,	871
Lacombe Wool-Growers' Association, by A. J. Cameron, Secretary.....	872
Pinches' Wool-Growers' Association, by J. W. Harwood, Secretary-Treasurer	872
Vermilion Wool-Growers' Association, by Job Mace, Secretary-Treasurer,	872

BRITISH COLUMBIA

Act, Dairies Regulation, by T. A. F. Wiancko, Provincial Dairy Instructor. . . .	498
Agricultural Instruction, The University and, by L. S. Klinck, Dean of College of Agriculture.....	973
Agricultural Legislation, Recent, by W. E. Scott, Deputy Minister of Agriculture, Victoria.....	569
Agriculture and Home Economics, Short Courses In, by S. H. Hopkins, B.S.A., Assistant Live Stock Commissioner.....	386
Agriculture, New Minister of.....	219
Alfalfa, The Wintering of, by H. O. English, B.S.A., Chief, Soil and Crop Instructor	577
Apple Scab in British Columbia, Controlling, by R. M. Winslow, B.S.A., Provincial Horticulturist and Inspector of Fruit Pests.....	210
Book-Keeping, Farm, by Wm. E. Scott, Deputy Minister of Agriculture	581
Boys' and Girls' Clubs, by H. O. English, B.A., B.S.A., Chief, Soil and Crop Instructor.....	141
Canning, Efforts to Popularize Home, by John Kyle, Organizer of Technical Education for British Columbia.....	778
Canning, Fruits and Vegetables, Home, by Wm. E. Scott, Deputy Minister, Department of Agriculture.....	777
Clubs, Boys' and Girls', by H. O. English, B.A., B.S.A., Chief Soil and Crop Instructor.....	141
Competitions, Field Crop, by H. O. English, B.A., B.S.A., Chief Soil and Crop Instructor.....	142
Contests, Boys' and Girls' Club.....	482
Control of Gophers, The, by Wm. J. Bonavia, Secretary, Department of Agriculture.....	40
Controlling Apple Scab in British Columbia, by R. M. Winslow, B.S.A., Provincial Horticulturist and Inspector of Fruit Pests.....	210
Co-operation in Dairying, by T. A. F. Wiancko, Provincial Dairy Inspector.....	140
Co-operative Marketing of Wool, The: Interior of British Columbia Wool-Growers' Association, by C. E. Lawrence, Secretary Treasurer.....	872
Cost of Production Survey.....	398
Dairies Regulation Act, The, by T. A. F. Wiancko, Provincial Dairy Instructor.....	498
Dairying, Co-operation In, by T. A. F. Wiancko, Provincial Dairy Inspector.....	140
Drainage, Land, by H. O. English, B.A., B.S.A., Chief Soil and Crop Instructor.....	192
Experiments, Spraying, by R. M. Winslow, B.S.A., Provincial Horticulturist and Inspector of Fruit Pests.....	209
Farm Book-Keeping, by W. E. Scott, Deputy Minister of Agriculture.....	581
Farm Labour, by Wm. E. Scott, Deputy Minister of Agriculture.....	392
Farm Loans and Land Settlement, by Maxwell Smith, Chairman, Land Settlement Board.....	959
Field Crop Competitions, by H. O. English, B.A., B.S.A., Chief Soil and Crop Instructor.....	142
Gophers, The Control of, by Wm. J. Bonavia, Secretary, Department of Agriculture.....	40
Importations, Nursery Stock, by R. C. Treherne, Dominion Superintendent of Fumigation and W. H. Lyne, Provincial Inspector of Imported Nursery Stock.....	46
Labour, Farm, by Wm. E. Scott, Deputy Minister of Agriculture.....	392
Land Drainage, by H. O. English, B.A., B.S.A., Chief, Soil and Crop Instructor,	192
Land Settlement and Farm Loans, by Maxwell Smith, Chairman, Land Settlement Board.....	959
Legislation, Recent Agricultural, by W. E. Scott, Deputy Minister of Agriculture, Victoria.....	569
McLean, Professor J. A.....	46
Minister of Agriculture, The New.....	219
Notes from British Columbia, by J. Roy McLennan, Editor and Chief, Publications Branch, Department of Agriculture, Victoria, B.C.....	399
Nursery Stock Importations, by R. C. Treherne, Dominion Superintendent of Fumigation and W. H. Lyne, Provincial Inspector of Imported Nursery Stock,	46
Production, Efforts for Greater, by Wm. E. Scott, Deputy Minister, Department of Agriculture.....	273

Production Survey, Cost of	398
Short Courses in Agriculture and Home Economics, by S. H. Hopkins, B.S.A., Assistant Live Stock Commissioner.....	386
Spraying Experiment by R. M. Winslow B.S.A., Provincial Horticulturist and Inspector of Fruit Pests.....	209
Stallion Enrolment in Canada	974
University and Agricultural Instruction, The.....	973
Wool, Co-operative Marketing of, The, by C. E. Lawrence, Secretary-Treasurer	872

PART III

PRINCE EDWARD ISLAND.

Agricultural Equipment in Public Schools, by J. E. McLarty, B.S.A., Rural Science Department	699
Fairs, School, by W. R. Reek, B.S.A., Director of Agricultural Instruction	48
Gardening, Home and School, by J. E. McLarty, B.S.A., in charge of Rural Science Department, Prince of Wales College	220
Rural School Consolidation, by Theodore Ross, B.A., Secretary-treasurer	901
Schools, Agricultural Equipment in Public, by J. E. McLarty, B.S.A., Rural Science Department	699
School and Community Improvement, by Miss Hazel Sterns, Supervisor of Women's Institutes.....	314
School Consolidation, Rural, by W. J. Reid, B.S.A., Director of Agricultural Instruction	901
School Fairs, by W. R. Reek, B.S.A., Director of Agricultural Instruction	48
Teachers, Summer Schools for, by W. J. Reid, B.S.A., Director of Agricultural Instruction.....	601

NOVA SCOTIA.

Courses in Agriculture for Teachers, Summer, by L. A. DeWolfe, Director of Rural Science Schools, Truro, N.S	887
Fairs, School, by L. A. DeWolfe, Director of Rural Science Schools, Truro, N.S	48
Gardening, Home and School, by L. A. DeWolfe, Director Rural Science Schools	221
Library, The Package, by M. Cumming, B.S.A., Secretary for Agriculture	605
Nursery Stock for School Planting, by L. A. DeWolfe, Director of Rural Science Schools	802
Package Library, The, by M. Cumming, B.A., B.S.A., Secretary for Agriculture	605
Rural School Consolidation	976
Rural School Consolidation, by A. H. McKay, B.A., LL.D., Superintendent of Education	901
Rural Science Activities, by L. A. DeWolfe, B.A., Director Rural Science Schools	976
Rural Science Teachers and School Gardens, by A. H. McKay, B.A., LL.D., Superintendent of Education for Nova Scotia	975
Rural Science, The School Inspector and, by E. Robinson, Inspector Division No. 5	499
School Consolidation, Rural, by A. H. McKay, B.A., LL.D., Superintendent of Education	901
School Fairs, by L. A. DeWolfe, Director of Rural Science Schools	48
Schools for Teachers, Summer	601
School Gardens, Rural Science Teachers and, by A. H. McKay, B.A., LL.D., Superintendent of Education for Nova Scotia	975
School Gardens and Greater Production, by L. A. DeWolfe, Director of Rural Science	1073
School Inspector and Rural Science, The, by E. Robinson, Inspector, Division No. 5	499
Summer Courses in Agriculture for Teachers, by L. A. DeWolfe, Director of Rural Science Schools	887
Summer Schools for Teachers.....	601
Women's Institutes, The, by Miss Jennie A. Fraser, Superintendent.....	315

NEW BRUNSWICK.

Agricultural Equipment in Public Schools, by R. P. Steeves, M.A., Director, Elementary Agricultural Education.....	700
Agricultural Instruction, Normal School, Fredericton, by R. P. Gorham, Director of Agriculture and Nature Study.....	978
Bird House Fair, A.....	610

Courses in Agriculture for Teachers, Summer, by R. P. Steeves, B.A., Director, Elementary Education	887
Fairs, School, by R. P. Steeves, M.A., Director, Elementary Agricultural Education	50
Home and School Gardening, by R. P. Steeves, M.A., Director, Elementary Agricultural Education	222
Household Science in Normal Schools, by Hedley V. B. Bridges, M.A., LL.D., Principal, Normal School, Fredericton	400
Household Science, Scholarships for, by Miss Hazel Winter, Supervisor, Women's Institutes	706
Normal School, Fredericton, Agricultural Instruction, by R. P. Gorham, Director of Agriculture and Nature Study	978
Normal Schools, Household Science in, by Heldey V. B. Bridges, M.A., LL.D., Principal, Normal School, Fredericton	400
Nursery Stock for School Planting, by R. P. Steeves, M.A., Director, Elementary Agricultural Education	802
Rural School Consolidation, by W. S. Carter, M.A., LL.D., Chief Superintendent of Education	902
Scholarships for Household Science, by Miss Hazel E. Winter, Supervisor of Women's Institutes	706
Schools, Agricultural Equipment in Public, by R. P. Steeves, M.A., Director, Elementary Agricultural Education	700
School Consolidation, Rural, by W. S. Carter, M.A., LL.D., Chief Superintendent of Education	902
School Fairs, by R. P. Steeves, M.A., Director, Elementary Agricultural Education	50
School Gardens and Greater Production, by R. P. Steeves, B.A., Director Elementary Agricultural Education	1073
School Gardens, Vacation Care of	610
Summer School for Teachers	602
Summer Courses in Agriculture for Teachers, by R. P. Steeves, B.A., Director Elementary Education	887
Teachers, Summer Schools for	602
Vacation Care of School Gardens	610

QUEBEC.

Fairs, School, by Jean-Charles Magnan, B.S.A., Superintendent of School Gardens	52
Home and School Gardening, by Jean-Charles Magnan, Superintendent of School Gardens	223
Household Science, The Teaching of, by Father O. L. Martin, Inspector of Domestic Science Schools	143
Inspector and Rural Science, The, by J. H. Hunter, M.A., B.Paed., Inspector of Schools, Coaticook, Que	608
Rural Science, The Inspector and, by J. H. Hunter, M.A., B.Paed., Inspector of Schools, Coaticook, Que	608
School Fairs, by Jean-Charles Magnan, B.S.A., Superintendent of School Gardens	52
Teaching of Household Science, The, by Fr. O. L. Marten, Inspector of Domestic Science Schools	143

MACDONALD COLLEGE.

Courses in Agriculture for Teachers, Summer, by F. C. Harrison, D.Sc., Principal	888
Fairs, School, by J. Egbert McOuat, B.S.A., Demonstrator to Rural Schools	54
Household Science, The Teaching of, by Katherine A. Fisher, Head of School of Household Science	146
Lunches in Rural Districts, School, by Jeanette Babb, Household Science Assistant	978
Potato Plots in School Fairs Competition, Observations Made While Visits to Were Paid, by J. Harold McOuat, Macdonald College	56
Principal of School of Household Science Resigns	906
School Fairs, by J. Egbert McOuat, B.S.A., Demonstrator to Rural Schools	54
Schools for Teachers, Summer	602
School Lunches in Rural Districts by Jeannette Babb, Household Science Assistant	978
Summer Courses in Agriculture for Teachers, by F. C. Harrison, D.Sc., Principal	888
Summer Schools for Teachers	602
Teaching of Household Science, The, by Katherine A. Fisher, Head of School of Household Science	146
Visits to Potato Plots in School Fair Competitions Were Paid, Observations Made While, by Harold McOuat, Macdonald College	56

ONTARIO.

Agricultural Equipment in Public Schools, by J. B. Dandeno, Ph.D., Inspector of Agricultural Classes, Department of Education...	701
Agricultural Instruction in Primary and Secondary Schools...	507
Agricultural Teaching in the Public and Separate Schools...	707
Courses in Agriculture for Teachers, Summer, by J. B. Dandeno, Inspector of Elementary Agricultural Classes...	890
Courses in Domestic Science, Short...	903
Domestic Science, Short Courses in...	903
Equipment in Public Schools, Agricultural, by J. B. Dandeno, Ph.D., Inspector of Agricultural Classes, Department of Education...	701
Fairs, Examination at School, by E. K. Hampson, District Representative, Welland County...	976
Fairs, School, by C. F. Bailey, S.S.A., Assistant Deputy Minister of Agriculture...	57
Food Production, Increased. Circular sent by Hon. R. A. Pyne, Minister of Education, to School Inspectors and Teachers	231
Home and School Gardening, by J. B. Dandeno, Ph.D., Inspector of Elementary Agricultural Classes	224
Household Science in Normal Schools—	
Ottawa Normal School...	401
Stratford Normal School, by S. Silcox, Principal...	401
Hamilton Normal School, by S. A. Morgan, Principal...	401
Library, The Package, Macdonald Institute, Guelph, by Miss M. U. Watson, Director	605
Nursery Stock for School Planting, by J. B. Dandeno, Ph.D., Inspector of Elementary Agricultural Classes	803
Package Library, The, Macdonald Institute, Guelph, by Miss M. U. Watson, Director	605
Rural Leadership, School for...	810
Rural Science, The School Inspector and, by J. W. Forrester, Public School Inspector, Dundas County	499
By P. J. Thompson Inspector of Public Schools, London	501
By J. N. Denyes, Inspector of Public Schools, Milton	502
Schools, Agricultural Equipment in, by J. B. Dandeno, Ph.D., Inspector, Agricultural Classes, Department of Education...	701
Schools, Agricultural Instruction in Primary and Secondary...	507
Schools, Agricultural Teaching in the Public and Separate...	707
School Fairs, by C. F. Bailey, B.S.A., Assistant Deputy Minister of Agriculture...	57
School Fairs, Examination at, by E. K. Hampson, District Representative, Welland County...	976
School Gardens and Greater Production, by J. B. Dandeno, Ph.D., Inspector of Elementary Agricultural Education...	1075
School for Rural Leadership	810
Schools for Teachers, Summer...	603
School Ground Improvement	904
School Inspector and Rural Science, The, by J. W. Forrester, Public School Inspector, Dundas County...	499
By P. J. Thompson, Inspector of Public Schools, London	501
By J. N. Denyes, Inspector of Schools, Milton...	502
Short Courses in Domestic Science	903
Summer Courses in Agriculture for Teachers, by J. B. Dandeno, Ph.D., Inspector of Elementary Agricultural Classes...	890
Summer Schools for Teachers	603
Teaching in the Public and Separate Schools, Agricultural...	707

MANITOBA.

Boys and Girls' Clubs and the Public School, by S. T. Newton, Director, Agricultural Extension Service...	981
Boys' and Girls' Clubs, by J. H. Kiteley, Superintendent of Education...	1079
Clubs, Boys' and Girls' and the Public Schools, by S. T. Newton, Director, Agricultural Extension Service...	981
Conference, School Inspectors'	74
Courses in Agriculture for Teachers, Summer, by R. Fletcher, Deputy Minister of Education...	894
Course, Summer, in Agriculture for Teachers...	708
Fairs, School, by S. T. Newton, B.S.A., Director of Extension Service...	59

Home and School Gardening, by S. E. Lang, Inspector of Secondary Schools, Winnipeg	316
Home and School Gardening	226
Household Science in Brandon Normal School	147
Inspectors' Conference, School	74
Library, The Package, by Mary G. Wood, Librarian	606
Nursery Stock for School Planting—	
By R. Fletcher, Deputy Minister	803
By B. J. Hales, B.A., LL.B., Principal, Normal School, Brandon	803
Package Library, The, by Mary G. Wood, Librarian	606
School Fairs, by S. T. Newton, B.S.A., Director of Extension Service	59
School Gardens and Greater Production, by R. Fletcher, Deputy Minister of Education	1076
School Inspectors' Conference	74
Short Course for Rural Ministers, by R. W. Murchie	811
Summer Courses in Agriculture for Teachers, by R. Fletcher, Deputy Minister of Education	894
Summer Course in Agriculture for Teachers	708
Rural Ministers, Short Course for, by R. W. Murchie	811
Teachers, Summer Course in Agriculture for	708

SASKATCHEWAN.

Agricultural Equipment in Public Schools, by A. W. Cocks, B.Sc., Director of School Agriculture	701
Boys' and Girls' Club Swine Contest	984
Courses in Agriculture for Teachers, Summer, by A. W. Cocks, B.Sc., Director of School of Agriculture	894
Equipment in Public Schools, Agricultural, by A. W. Cocks, B.Sc., Director of School Agriculture	701
Exhibition of School Garden Products	709
Fairs, School (Northern Saskatchewan), by Fred W. Bates, B.A., M.Sc., Director of School Agriculture	64
Fairs, School, (Southern Saskatchewan) by A. W. Cocks, B.Sc., Director of School Agriculture	66
Home and School Gardening (Northern Saskatchewan), by Fred W. Bates, B.A., M.Sc., Director of Agriculture	227
Home and School Gardening (Southern Saskatchewan), by A. W. Cocks, B.Sc., Director of Agriculture	226
Household Science Instruction, by Miss F. A. Twiss, Director of Household Science, Department of Education	402
Household Science Instruction, Normal School, Saskatoon, by Mrs. E. B. Rutter, Instructor in Household Science, University of Saskatchewan	403
Household Science Instruction, Normal School, Regina, by Miss Helen McMurtry	404
Household Science, Scholarships for	706
Instruction, Household Science by Miss F. A. Twiss, Director of Household Science, Department of Education	402
Instruction, Household Science, Normal School, Saskatoon, by Mrs. E. B. Rutter, Instructor in Household Science, University of Saskatchewan	403
Instruction, Household Science, Normal School, Regina, by Helen McMurtry	404
Lunches, Rural School, by Miss F. A. Twiss, Director of Household Science	611
Nursery Stock for School Planting, by A. W. Cocks, B.Sc., Director of School Agriculture	805
Rural School Lunches, by Miss F. A. Twiss, Director of Household Science	611
Rural Science, The School Inspector and, by A. Kennedy, M.A., Inspector of Schools Weyburn Inspectorate	502
Rural Science, The School Inspector and, by W. S. Cram, Inspector of Schools, Swift Current	505
Rural Science, The School Inspector and, by W. T. Hawkings, School Inspector, Moose Jaw	506
Scholarships for Household Science	706
Schools, Agricultural Equipment in Public, by A. W. Cocks, B.Sc., Director of School Agriculture	701
School Fairs, Northern Saskatchewan, by Fred W. Bates B.A., M.Sc., Director of School Agriculture	64
School Fairs, Southern Saskatchewan, by A. W. Cocks, B.Sc., Director of School Agriculture	66

School Fair and Rural Citizenship, The, By J. T. M. Anderson, M.A., LL.B., Inspector of Schools, Yorkton	709
School Fair and Teachers' Convention	611
School Gardens and Greater Production, by A. W. Cocks, B.Sc., Director of School Agriculture	1077
School Gardens and Greater Production, N. Saskatchewan, by Fred W. Bates, M.Sc., Director of School Agriculture	1078
School for Teachers, Summer	603
School Garden Products, Exhibition of	709
School Gardening in 1917, by A. W. Cocks, B.Sc., Director of School Agriculture	985
School Ground Improvement, An Example of, by Bert A. See, Chairman, Griffin School District	983
School Inspector and Rural Science, The, by A. Kennedy, M.A., Inspector of Schools, Weyburn Inspectorate	502
By W. S. Cram, Inspector of Schools, Swift Current	505
By W. T. Hawkings, School Inspector, Moose Jaw	506
Summer Courses in Agriculture for Teachers, by A. W. Cocks, B.Sc., Director of School Agriculture	894
Summer Schools for Teachers	603
Teachers' Convention, School Fair and	611

ALBERTA.

Agricultural Equipment in Public Schools	703
Courses in Agriculture for Teachers, Summer, by Jas. C. Miller, B.Sc., Ph.D., Provincial Director of Technical Education	897
Fairs, School, by J. C. McCaig, Editor of Publications	69
Home and School Gardening, by Jas. C. Miller, Provincial Director of Technical Education	228
Household Science in Normal Schools:	
Calgary, by E. W. Coffin, Principal	405
Camrose, by Margaret A. Stewart, Instructor in Household Arts	406
Nursery Stock for School Planting, by Jas. C. Miller, B.Sc., Ph.D., Provincial Director, Technical Education, Department of Education	806
Rural School Consolidation, by D. S. Mackenzie, Ph.D., Deputy Minister of Education	902
Schools, Agricultural Equipment in Public	703
School, Consolidation, Rural, by D. S. Mackenzie, Ph.D., Deputy Minister of Education	902
School Fairs, by J. McCaig, Editor of Publications	69
Schools for Teachers, Summer	603
Summer Courses in Agriculture for Teachers, by Jas. C. Miller, B.Sc., Ph.D., Provincial Director of Technical Education	897
Summer Schools for Teachers	603

BRITISH COLUMBIA.

Agricultural Course at Victoria High School, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	987
Agricultural Equipment in Public Schools, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	704
Agriculture in High Schools	149
Courses in Agriculture for Teachers, Summer, by J. W. Gibson, M.A. Director of Elementary Agricultural Education	899
Fairs, School, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	71
Home and School Gardening, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	229
Home Products Exhibition, Victoria, by J. W. Gibson, M.A., Director, Elementary Agricultural Education	74
Household Science, Scholarships for, by W. E. Scott, Deputy Minister of Agriculture	707
Nursery, A Provincial School, by J. W. Gibson, M.A., Director, Elementary Agricultural Education	806
Schools, Agricultural Equipment in Public, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	704
Schools, Agriculture in High	149
School Fairs, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	71

School Gardening in the Province.....	711
Schools for Teachers, Summer.....	604
Scholarships for Household Science, by W. E. Scott, Deputy Minister of Agriculture..	707
Summer Courses in Agriculture for Teachers, by J. W. Gibson, M.A., Director, Elementary Agricultural Education.	899
Summer Schools for Teachers.....	604
Victoria Home Products Exhibition, by J. W. Gibson, M.A., Director of Elementary Agricultural Education	74

PART V.

INDEX TO FOREIGN AGRICULTURAL INTELLIGENCE.

Agricultural Instruction by Correspondence in France.....	728
Alfalfa:	
Chemical Composition of with Regard to Time and Manner of Harvesting ..	527
Commercial Varieties in the United States ..	825
Transplanting Alfalfa ..	1013
Influence of the Time of Cutting on the Yield of Lucerne in Italy ..	1117
Anatomy and Physiology of Live stock:	
Influence of Ration and Age of First Calving on Cows ..	528
Apples:	
Fumigation of Apple Trees with Hydrocyanic Gas to Destroy Eggs of Aphids ..	927
<i>Xylaria</i> sp. Cause of Root-rot of the Apple in Virginia ..	1124
Argentina, Horsebreeding in ..	1118
Bacteriology and Soil Organisms:	
Stimulating Influence of Arsenic upon the Nitrogen-Fixing Organisms of the Soil ..	915
Recent Work at Rothamsted on the Partial Sterilization of the Soil ..	1005
New Experiments on Soil Sterilization in France ..	1009
Banks and Financial Operations in the United States ..	833
Barley, Production, Trade and Consumption of ..	742
Beans, Destruction of the Bean Germ ..	425
Bees, Wild Bees Attacking the Hive Bee in Brazil ..	829
Beets, Dry Matter in....	825
Belgium:	
Training for Partially Disabled Soldiers ..	738
Imports of Cereals into ..	746
The Belgian "Boerenbond" ..	1020
Blind Soldiers and Agriculture ..	525
Botany, Applied to Agriculture ..	526
Breeding of Live Stock:	
Economics of the Breeding of Pure Bred Stock ..	919
Sound Reasons for Pure Breds ..	1015
Age of Cattle used as Breeders in Maine ..	1015
Horse Breeding in Argentina ..	1118
Hereditary Transmission of "Curly Wool" in Karakul Sheep ..	1119
Brittany, Agriculture in ..	525
Butter:	
Effect of Carrots on ..	828
New Process for Preserving ..	1018
Cabbage, <i>Tortrix oleraceana</i> , Injurious to ..	927
Canning Club for Girls in the United States ..	634
<i>Carpocapsa pomonella</i> , Resistance to Cold of Larvae ..	530
Carrots, Effect on Butter.....	828
Cattle:	
Influence of Ration and Age of First Calving on Cows ..	528
Age of Cattle used as Breeders in Maine ..	1015
Methods and Cost of Growing Beef Cattle in the Corn Belt States ..	1121
Cereals, Production of in 1917.....	1023
<i>Chalcis calliphorae</i> Attacking Larvae of Sheep Maggot Flies ..	732
Cheese, Pasteurization of Milk for Making ..	830
Chemistry and Physiology of Plants:	
Amount of Humic Substances in Decomposing Leaves ..	422
Chemical Composition of Lucerne with Regard to Time and Manner of Harvesting.....	527

Root Systems and Leaf Areas of Corn and the Sorghums	626
Bacterial Test for Plant Food Accessories	825
Freezing Point Lowering of the Leaf Sap of <i>Persea Americana</i>	1011
Effects of Manganese and Iron on the Growth of Wheat	1012
<i>Chrysopa Californica</i> a Natural Enemy of Injurious Plants in the U.S.	632
Clover Leafhopper Injurious to Forage Plants	530
<i>Coccus-coccus</i> , Resistance to Cold of Larvae	530
Cold Resistance in <i>Persea Americana</i>	1011
Consumption of Cereals in Tropical Countries	930
Co-operation and Association:	
Danish Societies for the Exports of Eggs	430
Co-operative Marketing of Live Stock in Wisconsin	432
Co-operative Dairies in New Zealand	633
The Belgian "Boerenbond"	1020
Corn:	
Root Systems and Leaf Areas	626
Compulsory Degerming of Maize in Hungary	923
Crop Reports 434, 435, 436, 533, 536, 636, 641, 642, 741, 746, 836, 928, 1023, 1024,	1129
Cryptogamic Diseases in Soils Planted to Potatoes the First Time	737
Dairying:	
Metallic Taste in Dairy Products	427
Dairying in the River Murray Areas, Australia	628
Dairy Industry Act of New South Wales	629
Co-operative Dairies in New Zealand	633
Dairying Industry of England and Wales	923
Demonstration Trains in Russia	822
Demtchinsky Method, Producing Wheat by	1013
Denmark, Co-operative Societies for Export of Eggs in	430
Documentary Leaflets of the Institute	837
Dry Matter in Beets and other Roots	825
Eggs:	
Danish Export Societies	430
Preparation of Frozen and Dried Eggs in Egg Breaking Plants	631
Dwarf Eggs	829
Electricity:	
Overhead Electric Discharge and Crop Production	728
Feeding Stuffs, International Trade in	1005
Feeds and Feeding Live Stock:	
Experiments in Pig Feeding	425, 528
Feeding of Horses	627
Fish Meal as a Food for Pigs	732
Feeding Lambs with Maize Silage	828
Pumpkins as a Food for Sheep	921
Fish, Distribution of Fish and Fish Eggs by the U.S. Bureau of Fisheries	734
Forage, Production in Uruguay	627
France:	
Syndicate for Mechanical Agriculture	533
Agricultural Instruction by Correspondence in	728
Department for Civil and Military Gardens	739
Cost of Wheat in	837
Freights, Course of Ocean Freights on Wheat	637
Fruits and Fruit Growing:	
Fruiting of Trees in Consecutive Seasons	731
Regulation of the Fruit Trade in the United States	1125
<i>Galerucella cavigollis</i> , Injurious to Peach and Cherry Trees	429
Glanders, Diagnosis of	827
Great Britain:	
Settlement of Ex-Service Men	432
Increasing Crop Production	735
Women Workers on the Farm	835
Dairying Industry of England and Wales	923
Greenhouses, Summer Treatment of Soil	627
Grubs, in Wisconsin, White	429
Horses:	
Feeding of Draught Horses in Sweden	627
Arrangement for Safety of Horses in Case of Fire	830
Horse Breeding in Argentina	1118

Hygiene of Live Stock:	
Diagnosis of Glanders.....	827
Treatment of <i>Enteritis paratuberculosis bovis specifica</i> by Methylene Blue.....	918
Hygienic Drinking Trough.....	1017
Imperial Institute Investigations	625
Insecticides:	
Treatment of Plants in Flower with.....	422
Profit from Treating Potatoes with Bordeaux Mixture	426
Acid and Alkaline Spraying Mixtures.....	1018
Insurance, in North Dakota, State Hail	530
Italy, Institution of an Autonomous Ministry of Agriculture in.....	433
Kelp, Experimental Plant in California.....	916
Leaves, Amount of Humic Substances in Decomposing	422
Legislation:	
Dairy Industry Act of New South Wales.....	629
International Year Book of Agricultural Legislation.....	821
Live Stock Statistics:	
General	436
Sweden	535
France	637, 1131
Cuba	637
New Zealand	637
Netherlands	1025
Norway.....	1025
Canada	1025
Denmark	1131
Machinery and Implements:	
Farm Machinery in Russia	628
Fires and Dust Explosions in Threshing Machines	628
Double Plough for Disabled Soldiers	921
Trailer for Men who have Lost a Leg.....	921
Aebi High Pressure Liquid Manure Pump	922
Comparative Cost of Tractor and Horse Power in the United States	1016
The Dowling Plough	1017
The Ransome Three-Row Ridger	1017
Bates-Joliet Tractor with Extensible Steering	1017
The Jullien Tool Holder for One-Armed Men	1121
Manures and Manuring:	
Comparison between the Effects of Manuring Potatoes with Nitrate of Soda and Sulphate of Ammonia	424
Aebi High Pressure Liquid Manure Pump	922
Marketing of Live Stock in Wisconsin, Co-operative	432
Meats:	
Tendency Towards Levelling in the Price of Fresh and Frozen Meats	529
Meat Production and Trade in the United States and Other Countries	924
Exports from Argentina, Australia and New Zealand	1024
Medicinal Plants, Production and Improvement of in Russia	918
Meteorology: Weather Forecasting and Mountain Stations	824
Milk and Milking:	
Pasteurization of Milk in Bottles.....	529
International Market for Milk and Milk Products	629
Pasteurization of Milk for Chesse Making	830
Mistletoe Injury to Conifers	529
Mushroom, New or Interesting Mushrooms in England	736
Nasonia brevicornis, Attacking Larvæ of Sheep Maggot Flies.....	732
New Zealand:	
Co-operative Dairies in	633
Settling Discharged Soldiers on the Land	740
Nitrates, Washing out of from Arabia Soil at Rothamstead.....	824
Oats:	
Phytophthora Injurious to	428
Production, Trade and Consumption of.....	742
Peanut Oil.....	826
Phytophthora, Injurious to Oats in America	428
Pigs:	
Experiments in Feeding	425, 528
Fish Meal as a Food for	732

Plant Breeding:	
Crossing Sunflowers to Obtain Form Resistant to Rust	526
Selection Experiment on Raspberries	917
Potash, Increase of the Output of American	1116
Potatoes:	
Manuring with Nitrate of Soda and Sulphate of Ammonia	424
Profit from Treating with Bordeaux Mixture	426
Value of Immature Tubers as Seed	730
Verticillium Disease of the Potato in Ireland	927
Cultivation of Potatoes from Potato Skins	1014
Flowers of Sulphur for Preserving Potatoes	1018
Poultry:	
Influence of Constitutional Vigour	528
Fecundity in Hens in Relation to Stamina	734
Control of Contagious Epithelioma in Chickens by Vaccination	827
Physiology of Reproduction in	829
Prices:	
Tendency Towards Levelling in the Prices of Fresh and Frozen Meats	529
Course of Wheat Prices in North America	638
Prophylaxis in Vegetable Pathology	428
Pumpkins as a Food for Sheep	921
Raspberries, Selection Experiments on	917
Returned Soldiers:	
Land Settlement of, in England	432
Agricultural Training for Partially Disabled Belgian Soldiers	738
Land Settlement of, in New Zealand	740
Roumania, Agriculture and Agricultural Industries in	727
Rural Economics:	
Profit from Treating Potatoes with Bordeaux Mixture	426
Farm Management Practice in Pennsylvania	529
Influence of Distance to Market on Value of Real Estate	529
Increasing Crop Production in the United Kingdom	735
Economics of the Breeding of Pure Bred Stock	919
Normal Day's Work of Farm Implements, Workmen and Crews in Western New York	922
Value of Silage	1015
Comparative Cost of Tractor and Horse Power in the United States	1016
Methods and Cost of Growing Beef Cattle in Corn Belt States	1121
Regulation of the Fruit Trade in the United States	1125
Russia:	
Farm Machine Industry and Co-operative Purchase	628
Demonstration Trains in	822
Rust of Graminæ, Wintering of the Teleutospores of	529
Rye, Production, Trade and Consumption	742
Seeds:	
Agricultural Value of Impermeable Seeds	626
"Upsulum" for Treating Seeds	831
Production of Sugar Beet Seeds in Russia	917
Sheep:	
Feeding Lambs with Maize Silage	828
Portable Shelter for	830
Pumpkins as a Food for	921
Hereditary Transmission of "Curly Wool" in Karakul Sheep	1119
Silage, Value of	1015
Soils:	
Summer Treatment of Greenhouse Soils	527
Washing out of the Nitrates from the Arable Soil at Rothamsted	824
Relation Between Alkalinity of the Culture Medium and the Plant Yield	916
Recent Work at Rothamsted on Partial Sterilization of the Soil	1005
New Experiments on Soil Sterilization in France	1009
Sorghum, Root System and Leaf Areas of	626
Squirrel as an Enemy of Forest Plants and of Birds, The	1019
Sugar Beets, Production of Seed in Russia	917
Textile Plants, Industrial Retting of, by Microbiological Action	427

Threshing:

Injuries to Rye and Wheat Grain Produced by.....	424
Dust Explosions and Fires in Grain Separators in the Pacific Northwest.....	628
Timothy, Studies of the Plant.....	527
<i>Tortrix oleracea</i> , Injurious to Cabbage.....	927

Trade Statistics:

Imports and Exports of Cereals.....	435
Imports of Cereals into Belgium.....	746
Exports of Meats and Animal Products from Argentina, Australia and New Zealand.....	1024
Exports of Wool from the Union of South Africa.....	1130
Trees, Mistletoe Injury to Conifers.....	529
Trough, Hygienic Drinking.....	1017

United States:

Volunteer Co-operators with the Department of Agriculture.....	823
Federal Banks and Financial Operations.....	833
"Upsulum," New Preparation for Treatment of Cereal Grains against Fungoid Diseases.....	831
Uruguay, Production of Forage.....	627

Verticillium Disease of the Potato in Ireland.....	927
--	-----

Vine-Growing:

Enemies of the Grape in Ontario.....	737
--------------------------------------	-----

Wagons, Width of Tires for Different Loads and Roads.....	1121
---	------

Watering, Continued Capillary.....	826
------------------------------------	-----

Wheat:

"Thule," a Variety of Wheat suited to Central Sweden.....	423
Notes on the World's Cereal Situation.....	535
Wheat Prospects After the War.....	638
World's Wheat Prospects for 1917-18.....	839
Cost of, in France.....	837
Effects of Manganese and Iron on the Growth of Wheat.....	1012
Manitoba Wheat in Italy and France.....	1012
Production of Wheat by the Demtchinsky Method.....	1013
Yellow Rust on Wheat in Germany.....	1124
Women Workers on the Farm in Britain.....	835
Wood, New Method of Fireproofing.....	426
Wood Flour.....	830

<i>Xylaria</i> sp. Cause of Root-Rot of the Apple in Virginia.....	1124
--	------

Year Book of Agricultural Statistics.....	929
---	-----

Yellow Rust on Wheat in Germany.....	1124
--------------------------------------	------

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